MORE PUSH FOR THE PORSCHE page 16

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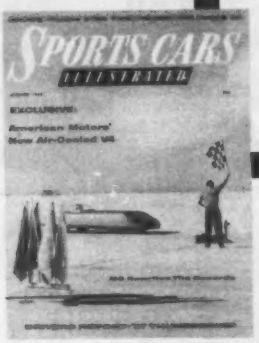

Ken Miles in the EX179 MG streamliner storms by the checker to take the 12-hour record for class F in three divisions. For the story of records and car, see pages 32 to 37. Ektachrome by Dan Rubin.

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very sincerely yours:

A couple of years back some of the higher-ups in the California Sports Car Club had an abortive idea that they could attract some new members and also add to the appeal of the club's racing program if there was a new class for the more impecunious specials builder. As proposed, the class would be for cars with engines under 1500 cc with no fender, headlight, starter, generator, spare tire, etc. requirements. The idea died aborning for some reason or other but to informed readers it must strike a note of prophecy. This pretty aptly describes the new Formula II so widely hailed in Europe and England.

For the time being at least, this strikes us as pretty fair class, especially for the enthusiast who doesn't want to race his bread-and-butter transportation but who lacks the funds to build a first rate special with all the requirements held dear by the FIA, Code Sportif and club rules. The cost of a basic special without all the lights, horns, seats and spares is reasonable but when the impedimenta is added the cost of material and the necessity for making space just about doubles the expense. Until the professional car builders start turning these cars out at six to ten thousand dollars a copy in great enough numbers to swamp the class, they should provide some top drawer fun for a lot of people who have been teetering on the edge with bank account in one hand and the month's bills in the other. Coming up in the very near future will be a run-down on what has been done up to the moment in this exciting class. With all the used 1500 cc machinery kicking about the country there's plenty of raw material.

* * *

From where we sit it seems that the rule-makers for the several racing clubs have an unenviable job. It's just plain too easy to goof. A good case in point can be made from the new Sports Car Club of America competition rules made public a short while back. Flat in the face of the announcement of the new Formula II came the SCCA pronouncement that they were abandoning Formula Libre, one of the oldest classes going. This would not have hurt anything if F II had been substituted, at least on a trial basis but it wasn't. The intimation was that the open-class machinery was to be put out to pasture, period. The overtones were such that dreary vistas came to mind of future races in which parades of dead-stock machines acted as curtain raisers for events in which dollars competed with dollars as factory behemoths were hurtled by semi-professionals around the various courses suitable for this sort of thing. Believe us, if such ever came to pass it would sound the death knell of sports car racing in the United States. We know; we've seen it happen before. When a guy has no chance at a slice of the pie he is just likely to decide on a diet. Moreover, the public loves an underdog, but when there isn't an underdog they go home—ask any former midget driver.

* * *

Also anent rule changes we note that the classes have been reorganized so that Corvettes and Jaguars no longer compete in the same bracket and the Mercedes-Benz 300 SL has been moved up to compete with the Jags. How this benefits anyone or tends to make things safer we fail to see. Certainly Jaguar gets no benefit since one fierce competitor is swapped for another one, the 300 SL being what it is. The Corvettes and the Jags were pretty well-matched and both took their lumps from the M-B, which raced in a different class. Come to think of it, in one way someone benefits. The Merc gets all the hardware in its class and the Corvette by default grabs the honors in its bracket. Jaguar gets left out of everything. Like we said, the rule-makers have an unenviable job.

* * *

People who have been selling Detroit short these last few years can now take a long second look. The first glance can be taken on page 26 whereon is presented our report on what could be America's answer to the Porsche—AMC's new V4. Save the second look for page 38 and Ford's 50,000 miles worth of records. For the third look keep an eye on future issues of SCI; very shortly we'll have a really sensational piece on a bit of "Detroit iron" that isn't so ironish after all.

—john christy

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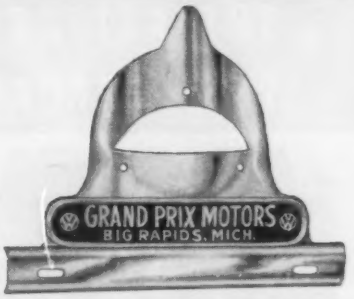

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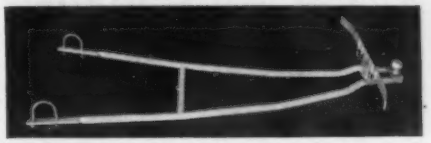

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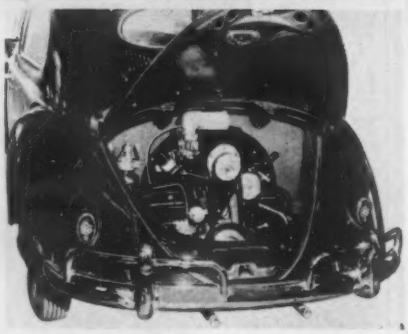

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letters

second-hand jag?

Dear Sir:

My main reason for writing is to ask you if you have on file (and at what cost?) road-tests on a 54 XK stock roadster? Also, any tuning articles, and feature articles of any type in re: said vehicle. I would like to get the performance specs on it. (Which reminds me of a friend who doubts my statement that this particular model Jag is capable of 120 plus. He says no six-cylinder 160 hp engine is going to push a 2800 pound car at that speed. All I could do was chuckle. I mean, if he wants to insist the grass is red, it's O.K. with me, y'know? And there's no place around here to take him for a ride . . . besides which, the car isn't safe for it — nor am I prepared to handle such speeds—I don't think. The car may be perfectly safe, but am I, with only about 7000 miles behind the wheel of the car?)

Sincerely,
Robert H. Leavitt
St. Albans, Vermont

You may get some ideas from our November issue, just off sale; many of the methods that apply to the 2.4 engine will apply to the XK series engines. Actually, you can get a C-type head and use either the C-type carburetion or—if you want to go the price—the D-type carburetion. The factory can supply the C cams or you can have Ed Iskenderian set you up in this department. The 140-MC pistons or 120-C pistons will drop right in with oversizes to .060 of an inch. Incidentally, don't take any bets on that car of yours doing 120 mph plus. The best stock 120-M of that vintage I ever saw at Bonneville cranked up just a shade over 118. However, a well-tuned 120-M with a ported C-type head and carburetion turned 132-plus in the same meet—but this is hardly stock 120 practice. — Ed.

flathead injectors

Dear Editor:

In your October issue you printed an article entitled "40 Easy Horses" which dealt with fuel injection. Would you know where I could write for further information on equipment for a '48 Ford V8 flathead?

Yours truly,
Bill Johnson
Denver, Colorado

Write to Hilborn Engineering, 1625 12th Street, Santa Monica, California.

elva conversion

Dear Sir:

I have read with much interest an article published in your October issue. This article, called "Special from Sussex," refers to a special Elva cylinder head which can be adapted to the small Ford engine.

I own and drive a 1956 Prefect and have been seeking information of this type to increase the power of my engine. Can you tell me if the Elva head is produced, and if so, how I can get one.

Sincerely,
W. G. Lindsay
Camp Shilo
Manitoba, Canada

The head and kit is the Elva IOE conversion, and is available at the Elva Engineering Co., London Road, Bexhill-on-Sea, Sussex, England. We suggest that you write to them directly.
— Ed.

mercedes 190 sl

Dear Sir:

I am planning on purchasing a Mercedes 190 SL in the near future. Your article on this car in the September issue of Sports Cars Illustrated mentions bugs in the early models. How can I be sure to get the latest model? Also, how is it possible to get a few more horses from the power plant?

Very truly yours,
Edward W. Ference
Toronto, Canada

Any new 190 SL you buy will be of the latest type. All of the earlier ones have been modified at the factory's request. That is; if the owners had the sense to comply. It is best to leave the 190 alone. If you want to take a chance, however, the normal details of engine modification will apply. — Ed.

renault engine rebuilding

Dear Editor:

In the July '56 issue of Sports Cars Illustrated, you featured an article on the Renault which brings to mind a question: Where can I obtain over-size pistons (which I need to stop oil burning) and wristpins for my Renault?

Sincerely yours,
R. N. McLaughlin
Corpus Christi, Texas

We have to inform you that no oversize pistons or wristpins are available for the Renault. Instead, the factory provides a complete engine rebuilding kit which includes matched piston and cylinder assemblies, rings, wristpins and gaskets for around $35. A somewhat better piston with four rings instead of three is made by Mahle in Germany for an equivalent cost. It too is available only in kit form. For further information, contact any Renault distributor or S. H. Arnolt, Inc., 415 E. Erie Street, Chicago, Illinois.

(Continued on page 60) *— Ed.*

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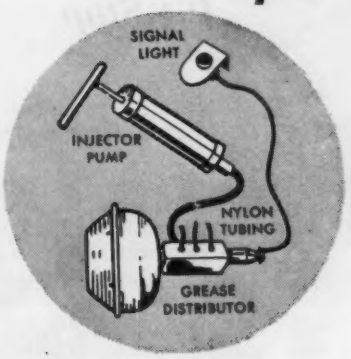

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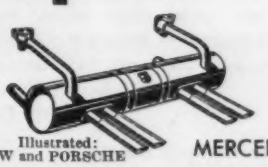

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Pit Stop

By KARL LUDVIGSEN

A JAGUAR BY THE TAIL

As an enthusiastic owner of a 1956 Jaguar XK140 I was very interested in the article on hotting up the new 2.4 Jaguar, published in the November, 1956 issue.

However, I would like to question Mr. Ludvigsen as regards the bearing dimensions on the crankshaft. He states that the main bearings "are 2¾ inches in diameter and one inch wide except for the front, center and rear, which are 1½ inches wide; big end journals are 2.0863 inches in diameter by one inch wide, these details being identical to the big engine".

The specifications I have for the XK140 are as follows: Main bearings, nos. 2, 3, 5 and 6 are 1 7/32 inches wide, no. 1 is 1 11/16 wide, no. 4 is 1¾ inches and no. 7 is 1⅞ wide. The big end bearings are 1 3/16 inches wide. These figures are also given in the data sheet published by "The Motor Trader" and are appreciably different from those quoted by Mr. Ludvigsen.

Another point that Mr. Ludvigsen makes is that the 3.5 engine has a Weller spring tensioner on the camshaft chain drive. My data sheet states that the Renolds hydraulic chain tensioner is fitted to all engines from no. 4431 onwards.

G. W. Hunt
Sudbury, Ontario

I want to congratulate you on the report on "Jaguar's Sawed-off Six", but would like to call your attention to one statement which I don't believe is correct. In the second column on page 55 you stated that valve float occurs at 700 rpm. I believe that this is just a mistake in printing, but if not, it interests me very much.

Michael Priwer
West Lafayette, Ind.

We appreciate this eagle-eyed readership, which keeps us on our editorial toes. To deal with the last query first, Mr. Priwer has interpreted the error correctly. Our typesetters have a habit of dropping zeros and playing it fast and loose with decimal points, and the correct figure was of course 7000 rpm. Also, most readers will have noticed that the top picture on page 27 was inverted.

We were shaken by Mr. Hunt's concise criticism, since our reference sources for the 2.4 article are usually regarded as authoritative. A little further digging revealed the happy fact that basically we were both right. The specifications that Mr. Hunt gives are those for the journal surfaces on the crankshaft, while our data referred specifically to the dimensions of the bearing inserts. In other words, all the main journal surfaces are slightly wider than the actual widths of the bearings. You may cry "foul" at the ¼ inch discrepancy at the center main, which takes end thrust, but this bearing shell is bracketed by two washers of .091-.093 or .095-.097 inch thickness, which have an additional end clearance of .004-006 inch.

There are two 3.5 liter crankshafts, numbered W1001 and W2646. The latter differs in that it is designed for eight instead of six flywheel bolts. All the bearing shells are definitely interchangeable between the 2.4 and 3.5 crankshafts. We have goofed fully on the published big end bearing width, which is correctly 1 3/16 inches. The supplementary remark on the chain tensioner is also valid.

HUSKY HILLMAN

This summer we brought back from England a Hillman Husky station wagon which gives marvelous performance in terms of miles per gallon, and also reasonable speed up to 65 miles per hour, but which is not quite fast enough for average driving conditions on American roads. I'm wondering what can be done, at a reasonable figure, to hop it up.

Forrester H. Scott
Salem, N. J.

It's too bad that the Husky doesn't have the new overhead valve Hillman engine, which in itself is hotter and with its many-ported head is very suitable for big power increases. You might see if any are available in your area. Otherwise, rather than go into the guts of the Hillman flathead here, I suggest you drop a line to V. W. Derrington, Ltd., 159-161 London Road, Kingston-on-Thames, England. They make all kinds of aluminum heads, intake and exhaust manifolds, etc. for Hillman as well as most other popular English cars, and they can give you supplementary modification details. This is probably the simplest bolt-on method, and will give good results if the ports and combustion chambers are clean, but the Husky will never be a Turnpike Cruiser.

BACKWARD FRENCHMAN

I would like to know if it's possible to get further detailed information on reversing the Renault engine and gearbox, as written up in your "Budget Boomer" article (SCI October, 1956). I have a '52 Renault and would like to make it perform and look better, not for racing but for everyday go-to-work use. I have plans drawn for the bodywork, but when I read the article I could see how reversing the power mechanism would improve things vastly.

Robert R. Brodie Jr.
Media, Pa.

The phrasing of your letter leads me to infer that you want to retain the Renault chassis while carrying out the reversing operation. Since the Renault is an integrally-built car, this would be far more trouble than it's worth. A new chassis would be in order. As to the mechanical aspects, the main internal change is the reversal of the differential carrier, with the ring gear, on its supporting bearings. This is very simple, and ensures that the car will start life in the right direction. Specific mounting and control problems depend on the details of your installation.

CORVETTE AT SEA

I have a '54 Corvette and two problems. At speed I get a considerable amount of body vibration due to the fact that the bolts which anchor body to frame have increased the size of the bolt holes in the Fiberglas. Also, it's getting so anything from a Rambler on up is a potential defeat at a stoplight. When I owned an MG I could take these defeats herocially and point out my gas mileage figures. Now, however . . . well, you get the idea. What's an inexpensive acceleration boost for the '54 150 bhp Chev six engine?

Ron Stewart
Evanston, Ill.

Your body problem is a common one with fibreglas structures. The best solution for now is to drill a proper-sized hole in a small metal plate and then bond the plate into the Fibreglas where needed. The new Epoxy resins make a weld-like bond with metal. A temporary solution might be the insertion of heavy rubber grommets between bolt and hole.

The 150 bhp version of the Chev six is already a pretty warm factory hop-up job, and there's not too much room for further modification within that structure. Especially cheaply. A worthwhile addition would be the Wayne twelve-port cylinder head. Frank McGurk has a wealth of information on this and other Chevrolet equipment. Write: McGurk Engineering Co., 440 S. Market St., Inglewood, Calif. The McCulloch blower is another useful tool, but it would be a task to fit it to the three sidedraft carbs. Don't forget also the big torque-producing GMC engine, which has always been an easy swap for a Chev. Finally there's the storming Chev V-8.

VW DETAILS

After reading your highly interesting article on the Porsche engine (June, 1956), a question comes to mind. Does the VW engine, like the Porsche mill, have a light-alloy block with chromed cylinder surfaces? Also, how much does the VW engine with drive components weigh?

Gerald Pease
Aberdeen, Wash.

The Volkswagen engine differs from the Porsche unit in that it has cast iron cylinders (not "block"), without chromed cylinder surfaces. This makes it infinitely easier to bore out and suit to your own purposes. The VW engine weighs 198 pounds, and the combined transmission and final drive unit weighs 134 pounds. The total is 332 pounds.

(Continued on page 64)

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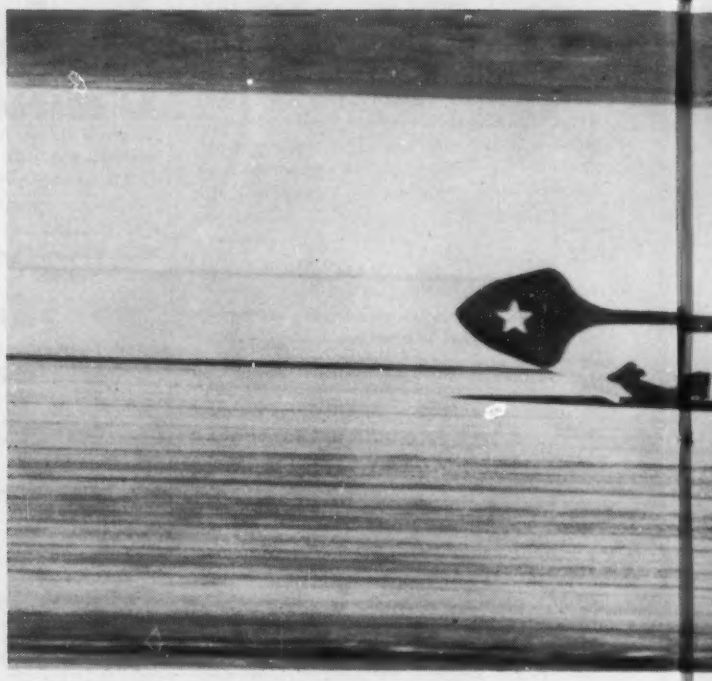
Shortly after a major company took the two-wheeler record, two Texas boys, short on cash, long on go, brought the record home with 214 mph.

The Texas

Jack Wilson fixes tape to the cockpit seams as Johnny Allen adjusts goggles just before start. Stormy Maugham, designer, stands at rear with launching rig.



The cigar-shaped Texan begins the run which will break existing records only recently set by the precisely engineered NSU cycles.

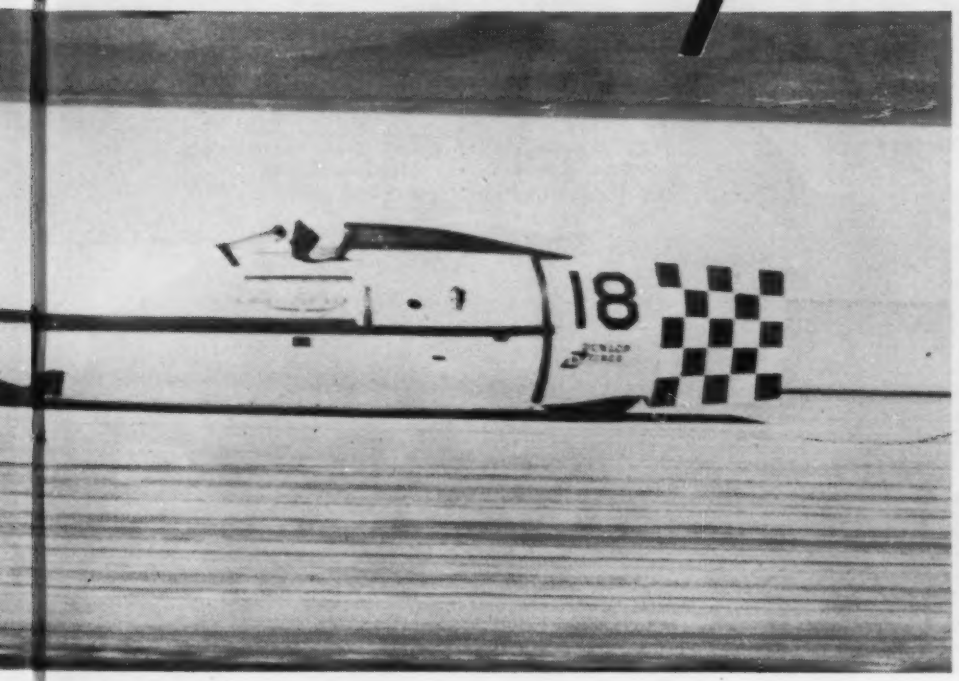
AT last an American holds the most bitterly contested record today. It's the "world's fastest" for motorcycles. For almost 15 years the record established at 173.99 mph by Walter Henne in a streamlined supercharged 30.5 cubic inch BMW on a German Autobahn seemed impossible to improve upon. People tried, but the efforts seemed half-hearted. It wasn't until 1951 that NSU managed to raise the mark and then only by a small margin.

The present record Donnybrook got off to a fine start in 1955. Two New Zealanders, Russell Wright and Robert Burns, with a home-built shell and a 61 cubic inch Vincent HRD motorcycle, had continuously raised the record on a New Zealand back road until it stood at 185.18 mph. The NSU people decided to get the record back and made their first trip ever to the Utah salt flats in July of that year. (See Sports Cars Illustrated, November, 1955.) Here they pushed the record to a scorching 211 mph with a streamlined, supercharged 30.5 cubic inch machine.

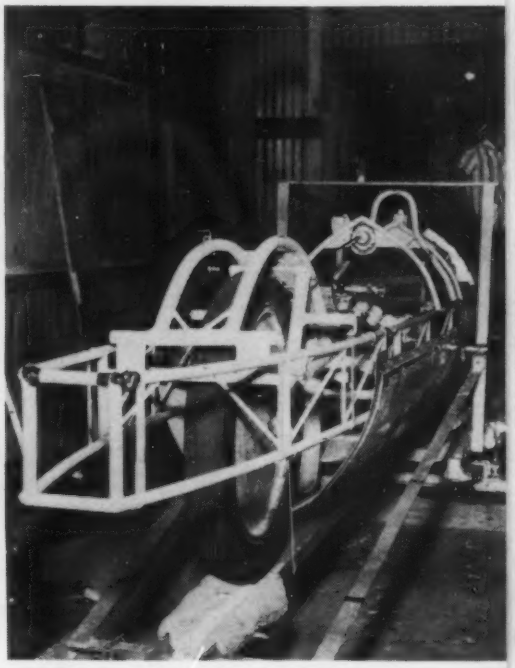
Wright and Burns, equipped with shell and motorcycle arrived in Wendover, Utah while the Germans were still using the salt. This, ironically enough, gave them the opportunity of watching their own record broken. However, they were pretty confident that on the salt flats their big twin would be able to see and raise anything the Germans could deal. Anyway, they were going to give it a try. Their chance came in August but luck wasn't with them and they were unable to squeeze more than 198 mph out of their outfit.

While people were trekking from the ends of the world to the salt flats to try to nail down the record that had suddenly become as hot as a two dollar pistol, a small group of Texans had some plans of their own about the place this record was going to call home. They had a streamlined shell, a couple of English Triumph engines and a little, steel-nerved rider who would keep the throttle turned on — and they made it. In September of '55, with a 40 cubic inch engine they raised the record to 214 mph — four mph over the month-old record set by the German factory. The crew of Texans would have first incensed the sober and methodical Germans and then would have stood back to laugh at them just when they were most exasperated.

Triumph



Worm's eye view of the Texas-built shell. Launching rig remains in place until cycle is fired and ready for run.



Chassis of the Triumph motorcycle is truss-type fabricated entirely from tubing. Stopping chute is held in rear.

Stormy Mangham, a pilot for American Airlines designed the shell. He hit upon the particular design (in the days before airplanes had pressurized cabins) by whittling streamlined shapes out of pine and holding them outside of the cabin window stuck on a wire – truly a Texas wind-tunnel.

Jack Wilson, the easy-going mechanic who likes to exercise his fine touch with Triumph engines, is a regular employee of a motorcycle shop in Texas. Johnny Allen, the rider, is a quiet, slight, little guy who manages a chrome-plating shop in Ft. Worth. Twenty-seven years old, weighing only 145 pounds, he's been riding motorcycles for 12 years, eight of these 12 in Class C competition. A leg smashed almost beyond repair on a California short track stopped his motorcycling until Mangham and Wilson turned up with their idea.

In 1955, a trip to Bonneville with the shell–christened "The Devil's Cigar"–and a 40 cubic inch Triumph engine, rewarded them with a time of 193.72 mph – faster than the then-existing record but timed by clocks not approved by the FIM, and therefore unrecognized. In August of '55, at the hot rod meeting on the salt, Allen won the admiration of the people in the world hardest to impress – the hot-rodders – by sending the shell with an unblown 30.5 cubic inch engine through the traps for a two-way average of 198 mph. The following week, Allen set the new record.

To watch these people make a record-run is a real privilege. To the observer, the record and the motorcycle become no more than symbols and it boils down to people at their favorite game – pitting all they know against terrific odds. Mangham blows a puff of cigarette smoke in the air to catch the direction of the wind, probably for no better reason than to be able to argue about it with Wilson later.

Wilson has little to do; his work has been done for weeks. A few last minute items to check and he becomes subordinate to Mangham – helping where he can in pushing the shell off for the run.

Allen becomes the center of interest; he dons a pair of mid-west bib overalls that contrast strangely with a brightly printed sports shirt. The legs of the overalls are taped and he climbs into the shell that's supported by a wheeled, tubular launching device. The seating position in this two-

(Continued on page 61)

SCI ROAD TEST: the MG a

MGA in profile measures 156 inches from bumper to bumper, and stands 2½ inches lower than the TF.

THE controversial "aerodynamic" MG is a true 100-mph sports car. Our best one-way speed of 101.1 mph was, to be sure, achieved with the help of a gentle zephyr at the rear, but off-setting this is the fact that we reached the full-century speed in only one mile. With a two-mile approach to the measured quarter, undoubtedly, we would have had a few more revs on the tach and a slightly quicker passage through the traps. What counts is that the "A" is an easy 15 mph faster than the TD, 10 mph faster than the TF1500, and stiff competition for such performance rivals as the Alfa Giulietta Sprint and the Porsche 1600 Speedster.

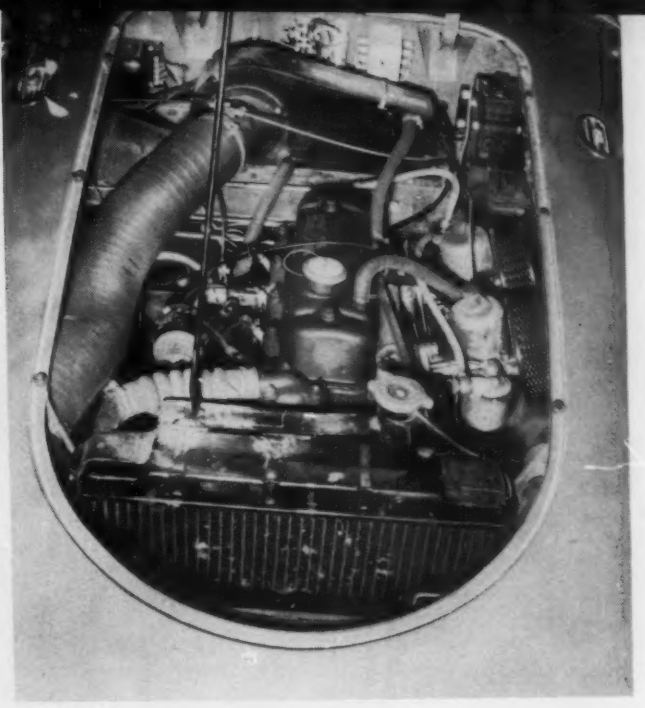
For most of us, nothing induces a friendly, responsive attitude toward a car—a willingness to be prejudiced in its favor—like a modest price. The "A" is a lot of sports car for its base price of $2195. It's almost entirely new mechanically; the only parts interchangeable with the TF are the steering rack and some front suspension components. Its body is sleek and suave and it has perhaps the first really stiff frame in the long evolution of the little hot rods from Abingdon-on-Thames.

But in spite of all the visible and hidden changes and improvements, you have only to drive the "A" around the block to recognize its old MG character. The engineer who designed the TC's noisy tappets, harsh ride, and loud exhaust system is apparently still bending over the drawing board. In spite of its contemporary look, better handling and thrustier performance, the "A" is still pure old-line MG Midget.

Like its ancestors it's a whole lot of fun to drive in spite of—or maybe because of—its imperfections. The steering as always is very quick over a large lock, and Detroit-conditioned drivers look somewhat palsied at the wheel until they sharpen their responses. Once they do, though, the alert steering naturally makes for excellent control of the machine. This steering is light, has a fairly strong self-centering action and is devoid of play. Minor road shocks are not felt through the steering wheel, but big bumps definitely are.

Another of the organs of the machine that retains the old MG's character is the gearbox. The remote shift lever is ideally at hand; stubby and short in travel, and the synchromesh is infallible. Pumping this lever through the cogs on our 5000 mile-old test car still took plenty of bicep power, but we understand that the transmission begins to limber up after seven or eight thousand miles.

Under the spare lies the battery. Luggage space is minimal after spare wheel has been set in place. Straps hold tool kit, missing here.



Most everything under the hood is accessible, but slightly cramped. Note large radiator for cooler running. Duct at right carries cool air to carbs

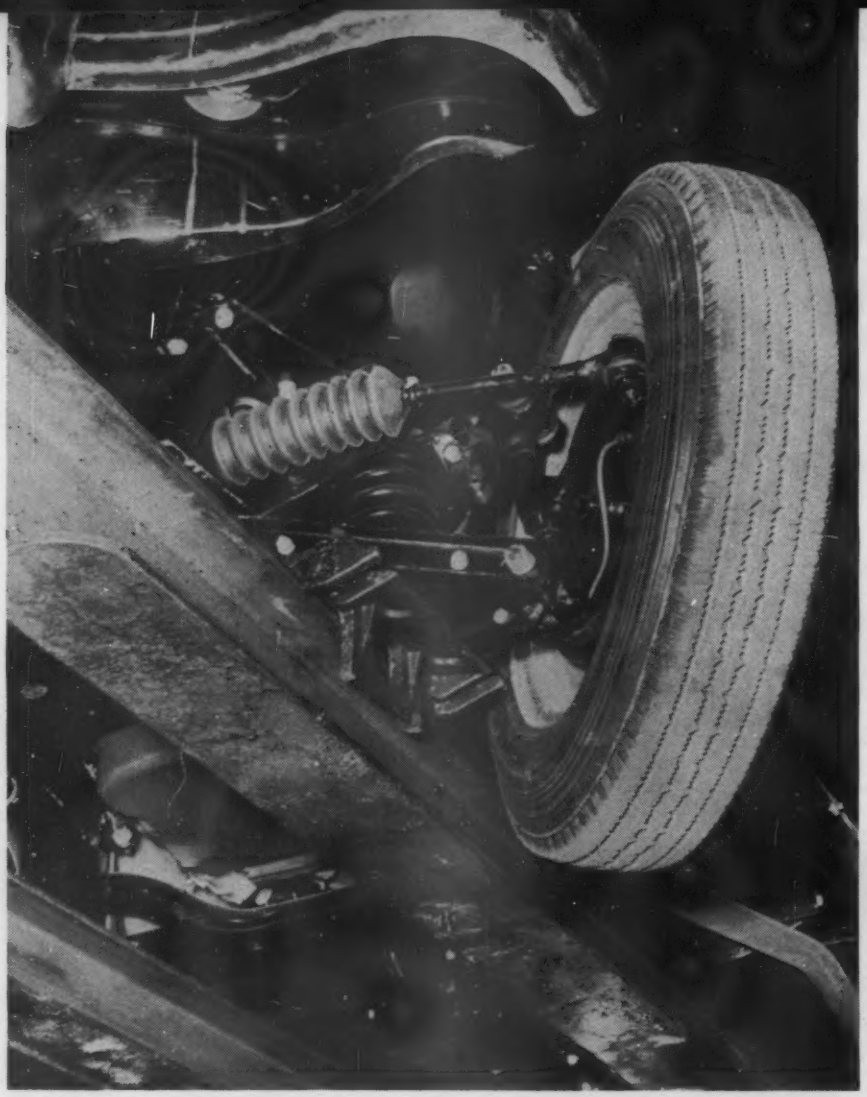
Car heads into SCI's familiar test curve at half throttle. Suspension worked a little hard, but kept the body fairly level.

The hydraulically-assisted clutch is light, strong and sure and upshifts can be made with lightning speed. Going down from third to second is slightly awkward and presents the possibility of crunching against reverse or even engaging it while moving forward at low speeds. Nevertheless, this is a good and very satisfying gearbox, despite the fact that low gear is overly low.

The "A's" ride is still another instance of blood telling. It's smooth on smooth pavement, and that's all. The rest of the time it's aggressively hard, in the spartan sports car tradition of the Thirties. Unlike a lot of modern light cars, which not only corner well but also absorb horrible bumps, the "A" and its occupants feel every surface ripple. Beyond about 80 or 85 mph, even on smooth pavement, the ride gets a little bouncy—this, in spite of the fact that a prototype of this chassis was run at better than 150 mph on the Bonneville Salt. (See pp. 32-37.)

But up to this point the car cruises free and easy and still retains pretty good acceleration. It has a solid, substantial, all-of-a-piece feel that's largely due to the "A's" new frame. The big, box-section rails are tied together by cross-members at something like two-foot intervals and to these are added a box-section superstructure that gives added

Drop-away hood offers little resistance to wind at speed, but protruding fenders may be little catch-alls.



Front suspension shows coil springs, A frames, rack and pinion steering, Fore and aft of cross-sectioned box member are heavy tubular members. Elaborate superstructure lies under cowl for additional bracing.

The A's dash has a full complement of instruments. Tach is driven off camshaft instead of generator as before.

stiffness at the firewall line. This is a heavy frame but a very stiff one, and because of the reduced weight of the "A's" engine, transmission and rear axle, its chassis weighs just about the same as the TF's. The body is securely mounted to the frame and on the roughest surfaces there is no sign of frame twisting or of body panels "working" independently. The doors close with a solid sound and they stay closed, unlike those on some of the springier-framed MG's.

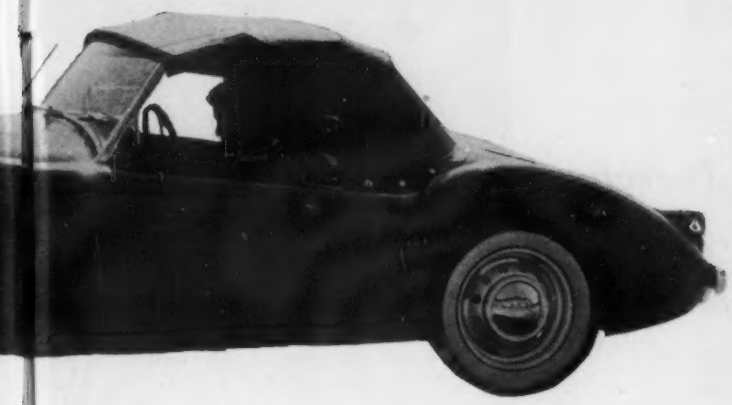
With a full tank of fuel the "A's" weight distribution is very close to 50-50, and this, combined with the stiff suspension and a close tread/wheelbase ratio helps give the car its well-balanced cornering qualities. Its bite in the turns is softer than the on-rails variety, but it sticks to the road very well—much better than its forebears did. Body roll and tire noise are slight. The rear tires begin to slide only when sorely tempted and then in a slow, controllable way.

As an accelerating machine the new MG goes much more briskly than the TF, in spite of nearly equal displacement and a 12 percent reduction in final drive ratio. Since horsepower and torque have gone up just 4.6 and 1.8 percent respectively, most of the gain in both acceleration and top speed has to be caused by the lower wind drag of the "A's" streamlined body. The acceleration curves of the "A" and the TF show that there's a big difference in the way that these similarly endowed cars penetrate the air.

The modified BMC B-type engine is basically the same as the one that powers the four-cylinder Morris, Wolsley and Austin except for its more sporting camshaft and dual carbs. The compact gauze-type air cleaners do little or no silencing and the moan of air being dragged into the cylinders gets really loud at about 70 mph. On the whole this is a pleasant sound, suggestive of gobs of power, but when the weather equipment is up it can get tiresome.

All the porting is on the left side of the engines. There are two intake ports and three for exhaust, feeding into a nicely contoured three-branch "header" type manifold. This style of porting is practically immune to the more advanced forms of intake and exhaust "ram" tuning, but since nobody is more aware of this than the factory, a simple remedy is undoubtedly already on the drawing boards. The throttle linkage is devious.

The throttle pedal is suspended from a shaft that extends to the right-hand side of the firewall. To a bracket on the far end of this shaft is attached a flexible cable that runs parallel to the right-hand side of the engine,



MG poses with its top up. Car looks clean with top in up or down position.

Trunk deck-lid releases from driver's compartment. Rear suspension is simple semi-elliptic with lever and piston type shocks. Ride is stiff.

then crosses over the top of it to connect with the throttle valves—which actually are no more than a few inches ahead of the foot pedal. Abingdon's engineers could have devised a more direct connection, but this one works very well.

During our warm-weather testing of the "A", the engine always fired up with no hesitation and quickly settled down to a somewhat rough idle at about 900 rpm. The engine revs willingly under load up about 4500 rpm, but at this point the tappets begin to chatter and you can feel the engine starting to work. The four-inch tachometer, now driven by the camshaft rather than the generator, has an orange pie-slice between 5500 and 6000. It also has a red warning slice from 6000 to 7000, but this is mainly decorative. The stock engine is wound very tight at 5500 in the indirect gears and the valve train protests politely but unmistakably. During acceleration runs we hit 5900 on a couple of occasions but retreated in haste. This is just about the limit. To venture into the red area on the tach is to invite the valves to come unglued. But at 5800 rpm in top gear (101.1 mph) the engine, though far from loafing, seems willing to sustain the pace indefinitely.

As it stands, this engine seems to be at the upper limit

(Continued on page 59)

MG-A

PERFORMANCE

TOP SPEED:

Two-way average	99.3 mph (top up)
Fastest one-way run	101.1 mph (top up); 96.7 (top down)

ACCELERATION: (Top down unless otherwise noted)

From Zero to	Seconds
30 mph	4.0
40 mph	6.3
50 mph	8.6
60 mph	14.1
70 mph	19.3; 18.5 (top up)
80 mph	26.5
Standing ¼ mile	19.6; 19.2 (top up)
Speed at end of quarter	73 mph

SPEED RANGES IN GEARS:

I	zero to indicated 30 mph.
II	15 to indicated 40 mph.
III	30 to indicated 60 mph.
IV	40 to indicated 90 mph.

SPEEDOMETER CORRECTION:

Indicated	Actual
30	30
40	38
50	47
60	57
70	67
80	77

FUEL CONSUMPTION:

Hard driving	23.6 mpg during speed runs.
Average driving (under 60 mph)	32.4 mpg

BRAKING EFFICIENCY:

1st stop	86
2nd stop	86
3rd stop	86
4th stop	85 (left rear wheel locking)
5th stop	85 (left rear wheel locking)
6th stop	75 (left rear wheel locking)
7th stop	75 (left rear wheel locking)
8th stop	74 (left rear wheel locking)
9th stop	74 (left rear wheel locking)
10th stop	75 (left rear wheel locking)

SPECIFICATIONS

POWER UNIT:

Type	In-line four.
Valve Arrangement	Pushrod-operated ohv.
Bore & Stroke (Engl. & Met.)	2.875 x 3.50 ins.; 73.025 x 89.0 mm.
Bore/Stroke Ratio	1.22 to one.
Displacement (Engl. & Met.)	90.88 cu. ins.; 1489 cc.
Compression Ratio	8.3 to one.
Carburetion by	Two 1.5 in. semi-downdraft S.U.
Max bhp @ rpm	68 @ 5500
Max. Torque @ rpm	77.4 @ 3500
Idle Speed	900 rpm

DRIVE TRAIN:

Final drive ratio (test car)	4.3 to one.
Other available final drive ratio	3.7, 4.1, 4.13, 4.55 to one.
Axle torque taken by	Springs.

CHASSIS:

Wheelbase	94 ins.
Front Tread	47.4 ins.
Rear Tread	48.8 ins.
Suspension, front	Independent by coil springs and wishbones.
Suspension, rear	Semi-elliptic.
Shock absorbers	Lever-and-piston type.
Steering type	Rack and pinion.
Steering wheels turns L to L	2.75
Turning diameter	28 ft.
Brake type	Front: two leading shoe; Rear: leading and trailing.
Brake lining area	134.4 sq. ins.
Tire size	5.60 x 15.

GENERAL:

Length	156 ins.
Width	58 ins.
Height	50 ins.
Weight, test car	2080 lbs.
Weight distribution, F/R (full fuel tank)	49.8/50.2
Weight distribution, F/R, with driver	49.8/50.2
Fuel capacity	12 gallons

RATING FACTORS:

Bhp per cu. in.	.748
Bhp per sq. in. piston area	2.62
Torque (lb-ft) per cu. in.	.852
Pounds per bhp—test car	30.6
Piston speed @ 60 mph	2007 fpm
Piston speed @ max bhp	3208 fpm
Brake lining area per ton (test car)	129 sq. ins.

BY OCEE RITCH

Even the most docile of Porsches can be made to get up and scoot with a few minor changes. Here is a blueprint for...

More Push for

The author's 1500 coupe charges off the line against a Super convertible. Car won its class at National drag meet, May, 1956.

AS IT emerges from the factory at Stuttgart, the Porsche is a finished piece of machinery which well exceeds the claims of its builders. Each car represents an engineering idea brought to fruition and each model does exactly what it was designed for. Nine different engines have been introduced since power-plant #P 10001 was fired up for the first time but body styling has remained basically the same.

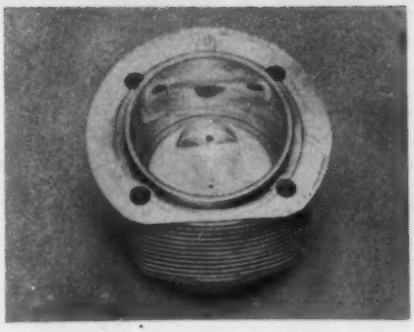
Five types are presently being produced: 1300, 1300 Super, 1600, 1600 S and the 1500 *Carrera* for highway driving. In the past, engines of 1100 cc and 1500 cc displacement have been built in both the "normal" and Super tune and the bulk of the Porsches in this country are of the 1500 type. (For racing, the 550 Spyder employs a hopped-up version of the *Carrera* engine; reversed in the chassis and with dual throat carburetors as part of the speed package.) A comparison of the various models can best be drawn from the accompanying chart, which gives displacement and horsepower.

Each of these series will give the owner a good run for his money and, from 30 feet away, it is difficult to say whether $3,000 or $6,000 has been invested. This looks like a pretty good situation—a choice of performance wrapped in the same neat package. But it seems to have bred frustration, created dissatisfaction and led to all manner of strange experiments.

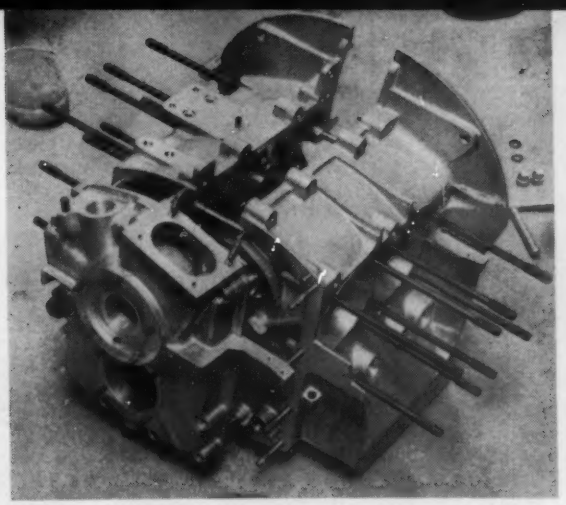
Porsche owners, not as fanatic as the Bentley Clan but almost on a par with the Bugattistes are constantly engaged in swapping information, tune-up hints, ideas, discoveries, theories and suppositions. In a meeting between two of these individuals the social amenities are quickly passed over in favor of a technical discussion which would be more in place if conducted by two apprentice mechanics taking a National Schools correspondence course. Ordinary service problems occupy the novice Porsche pusher but, unless he owns the latest and most potent number which Ferry has thought up, after the early thrill of ownership wears off a new theme dominates his conversation—"What can I do to it?"

Something *Can* Be Done

Don't mistake me, even the earliest *America* will scat!

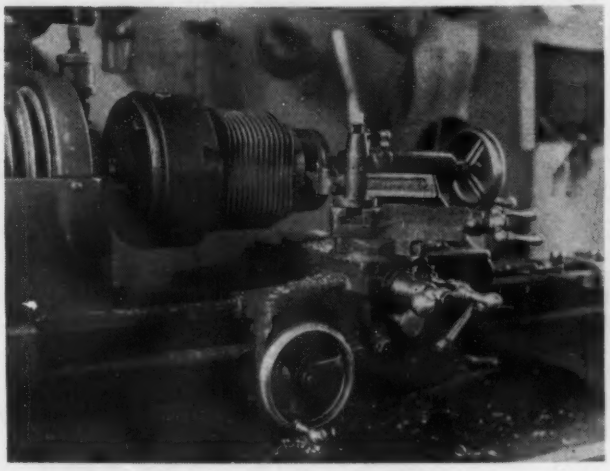


ABOVE — 1600 Super cylinder barrel and piston must be purchased as a set.
RIGHT — 3-piece block described in story.



The Porsche

Dale Reuter fits a 1600 cylinder to late model three-piece crankcase.



Normal barrel is chucked into a lathe for removal of .040 of an inch from bottom. Result is a compression ratio of 8.1 to 1.

There are few cars costing under $10,000 which will stay with the Porsche on a rugged cross-country trip. However, there is always the urge to make one go just a little bit better, to extract a little more horsepower from the flat four and to have that $5,000 performer for little more than a basic three grand. The *Carrera* owner is probably not cursed with this thirst, but the rest of us pursue the chimera of more "go" from the same engine.

As may be common knowledge, the factory does not encourage hot-rodding. This happens to be a logical viewpoint, too. The marque is relatively new and seeking to establish a reputation. Random horsing around with components might result in failure, internal carnage or short life and could reflect unfavorably on the manufacturer. If some squirrel scatters West German metal all over the landscape you can be sure the car would get the blame.

So, dealers have been furnished with all necessary maintenance instructions and buyers are requested to return the goods to these people for service. On the other hand, shop manuals are available from Hoffman-Porsche in New York City and if you can read, have a reasonable familiarity with internal combustion engines and are willing to invest in a number of tools, then there's nothing to stop you from being as informed as your service man except for experience.

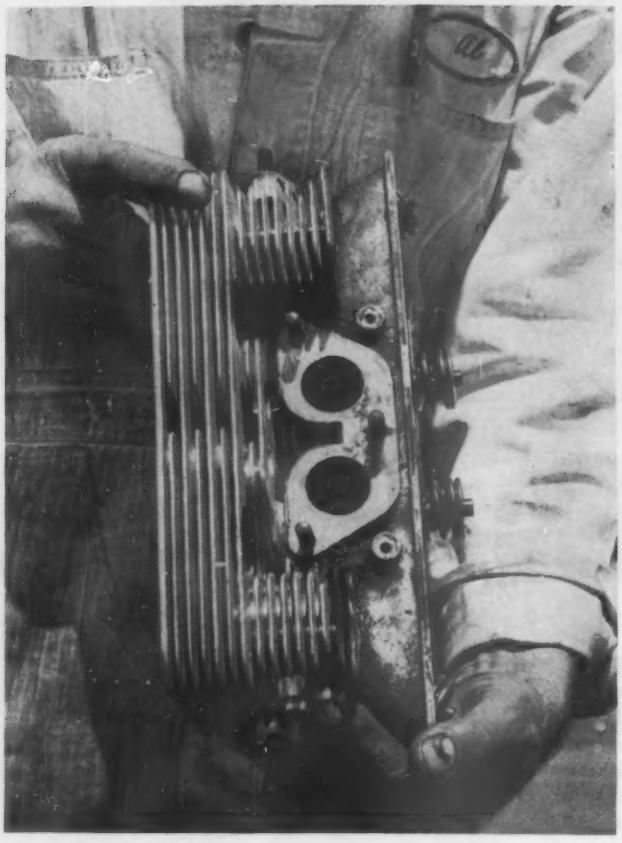
Most dealers are as busy as cats on a tin roof and don't dare do anything except routine repairs but once in a while you catch one with the old hop-up fever. In such a case you are also apt to find a bunch of highly non-stock Porsches screaming around the immediate vicinity. As a pre-war hot-rodder, inclinations to mill and fill, bore and stroke, port and relieve came naturally to me after getting my hooks on the "upper bracket VW" and I was lucky to run into a group of kindred spirits and a couple of Porsche shops where similar ideas hold sway.

Among the nine assorted Porsches in the vicinity only one is flat out stock—the Speedster which we race! The rest have had some treatment to increase their cruising speed. Such discoveries will be evaluated and passed along.

So, take heart, ye of little displacement, you, too, can play with the big boys.

Expert Advice Helps

What have we accomplished? Aside from a lot of happy hours spent in adjusting, fitting, polishing and piddling, the comradeship and social intercourse, we have learned about



ABOVE — The so-called Normal head has ports which are a bit inadequate to handle hop-up described. They can be ported without fuss and will accept Super-type intake manifolding. BELOW — For comparison purposes, here is Super head. Note generously sized ports. Even these can stand a little cleaning up. Carburetor used is Solex 40 PBIC.

COMPARISON CHART OF PORSCHE TYPES

	1300	1300S	1500	1500S	1600	1600S	Carrera
Bore	2.93	2.93	3.14	3.14	3.25	3.25	3.35
Stroke	2.91	2.91	2.91	2.91	2.91	2.91	2.59
Displacement (cubic inches)	78.75	78.75	91.5	91.5	96.5	96.5	91.5
Compression Ratio	6.5/1	8.2/1	7/1	8.2/1	7.5/1	8.7/1	9.5/1
Horsepower (din)	44	60	55	70	60	75	100

CAM CHARACTERISTICS AND VALVE TIMING

	Normal	Super
Intake opens BTDC	2 degrees, 30 seconds	19 degrees
Intake closes after TDC	37 30	54
Exhaust opens BTDC	37 30	54
Exhaust closes after TDC	2 30	19

ACCELERATION COMPARISON

	Zero to 40	Zero to 60
1500 Continental Coupe	7.8 seconds	13.5 seconds
1500 Super Speedster	5.6	10.3
1600 Speedster	7.0	12.2
1600 Super Speedster	5.0	9.7

Chart shows the infinite variety of combinations that can be had by intelligent interchanges of Porsche parts.

a fascinating vehicle, picked up several trophies and improved the breed without disturbing Stuttgart—much.

P & S Motors, VW-Porsche dealers in Bakersfield, California, headed by Dave Smith has been a big source of encouragement and help as well as a meeting place for exchange of ideas. Dave races and prods the rest of us on.

He and Shop Foreman Dale Reuter are opposed to any scheme for changing factory components but they expect, and do get the most from stock engines.

Fred Hannig of Hannig & Olbrich, 11557½ Ventura Blvd., Studio City, is another whose advice has been well used. Fred, who hails from Innsbruck, was formerly John Von Neuman's chief mechanic in charge of Johnny's racing stable. He is regarded as the top notch Porscher in the area.

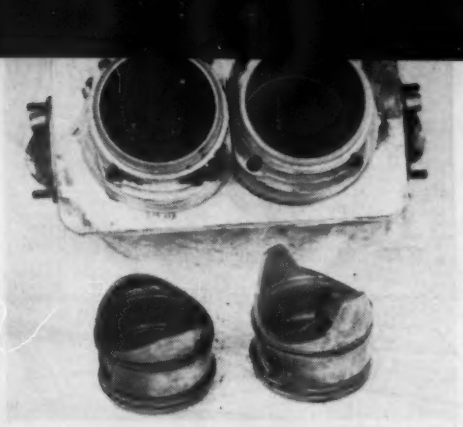
These people, as well as anyone experienced in the line, will say that the greatest single aid to better performance is mileage. Precision-fitted and designed to wear well together, parts which are tight at 1,000 miles begin to loosen at 5,000 and by the time 10,000 to 12,000 appears on the clock the car begins to show its stuff.

My own stock 1500 coupe turned in the following speeds at the local dragstrip from a standing start at the end of a quarter mile (electrically timed): 71.91 (3,500 miles on odometer), 73.56 (6,000 miles), 75.81 (12,000 miles) and one unofficial run of 78.51. An improvement of nearly 10% can be attributed to increased clearances in engine and driveline.

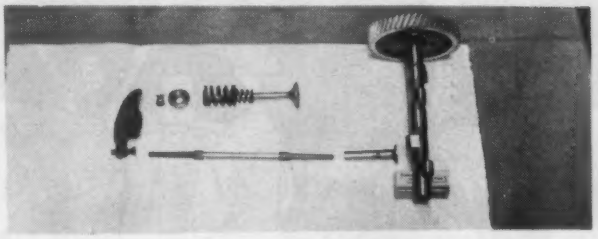
Tune Up For Go

To extract the most from his Porsche without going too deep, the owner should pay close attention to tune-up details: carburetion, ignition, timing and valve clearances. Taking the last first—tappets should be adjusted every 2,500 miles until they prove that they can be trusted. The alloy pushrods are not as critical as the steel type, but the coarse adjustment threads are pretty treacherous. After letting the engine cool for at least eight hours, go through the entire process twice. The correct setting for that particular engine is printed in three languages on the fan housing. Use this at all times.

In discussing carburetion it is well to keep in mind that there are a jillion jets for each of the two or three Solexes which are fitted, that the jet numbers are only a part



Comparison of 1500 barrel and piston, left, with 1600 assembly, right, on same head.



Valve train layout is simplicity itself; the only exception is the wood-centered tubular pushrod.

number—not a description in millimeters or inches—and are relative to each other. Generally, the Porsche benefits from going *one step* richer than the factory original. This is accomplished by going *up* one number on the main jet and a corresponding reduction in air-correction jet. For the same reason (difference in specific gravity between U.S. and European fuels) it is necessary to re-set the float level. With the top off and gasket removed, the fuel level should be measured at the meniscus (where the fluid creeps up the side of the bowl) with a depth gauge. Settings are: 16 mm for type 32 Solex and 20 mm for type 40 (.63 and .79 inches, respectively).

Carburetors should be synchronized with vacuum gauge or Air-Syn and pumps set to deliver the same amount of fuel per stroke—between .5 and .7 cc for the PBI 32 and between .7 and .9 on the larger models. (8, 10, or 13 drops from an eye-dropper.) Incidentally, an old eye-dropper with small end sealed can be used to take this measurement.

Points Of Ignition

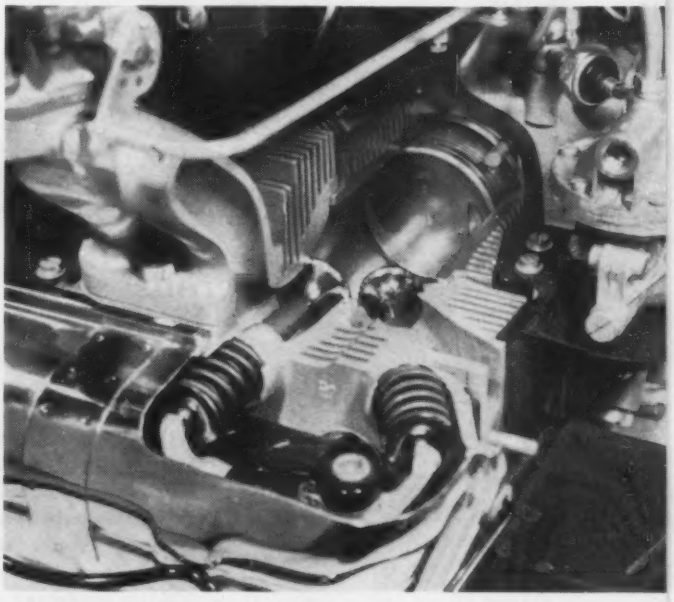
Ignition timing is another time-consuming job. Tiny differences in compression ratio effect this important feature and some competition or hot-rod experience comes in real handy. Most mechanics time by a static light with the distributor points breaking at $^{11}/_{32}$ of an inch BTDC for the Continental and $^{13}/_{32}$ of an inch on the Super. The measurement is made by matching the timing mark on the crank pulley with the center line of the crankcase.

Actually the Continental can be improved by adopting the Super timing unless horrible pinging noises develop in a particular engine. In tuning my car and the Speedster raced by Ed Tomerlin we have used the flashing-light at idling speed with success. The Cut & Try, By Guess & By God and We Play By Ear methods have also had a workout on this machine

Not to point with pride or to cast any bouquets—but just to brag a little, under Ed's handling this 1500 stock has never been beaten by another 1500. It has taken the measure of many a Super as well as E. Forbes Robinson's justly famed MGA and other class F production vehicles in CSCC and SCCA races. With my 1955 coupe I managed

(Continued on page 56)

Simplicity of Porsche Super engine is apparent in this bread-board layout. Engine work can be done easily on an average sized workbench or heavy table.



Cutaway Porsche engine shows valve and port relationship and the amount of "meat" around intake. Valve size is adequate and need not be increased.

BY DENNIS MAY

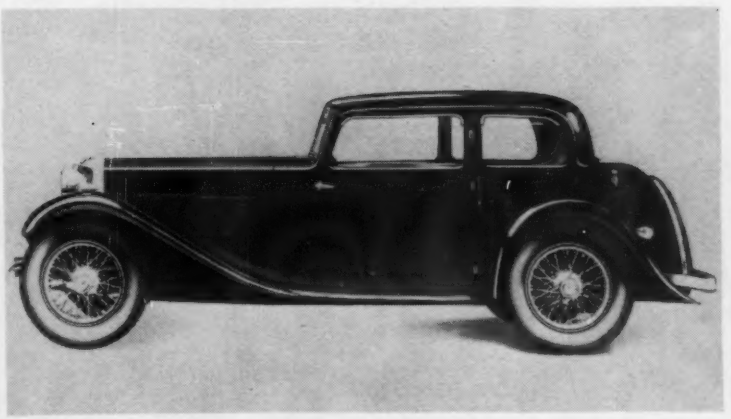
SIR WILLIAM

The glamorous skeleton in Jaguar's closet.

A quarter of a century ago it was an unwritten axiom among British car manufacturers that their public shrank, unanimously and with fervor, from the slick and the svelte in automobile design. Running counter to this bias would, they believed, have been about as lucrative as hawking Bikinis around a convent. Outside of the narrow field of *pur sang* sports cars it was therefore a tacit tradition for passenger vehicles not only to *be* slow but to look even slower than they were.

Then, in the autumn of 1931, something happened overnight that caused an upheaval of the old aesthetic standards. The SS made its debut at the annual London motor show. In the absence of any subtitle to the initials on the badge—actually they signified Swallow Sports—illbred persons seized on the soubriquet of Sexy Six for Mr. William Lyons' masterpiece. This was apt, too, for in hub-to-hub proximity with typical neighboring exhibits—decent Daimlers, humdrum Humbers, windjammer Wolseleys and the like—the rakish deb had all the incongruity of a strumpet at a christening.

To the pained surprise of the industry's diehard rank and file, the crowds thronging the huge Olympia show hall made for the SS like runners in a Le Mans start. For the full ten days' duration of Europe's biggest and most important automobile salon the Sexy Six was in a state of constant siege. "What's her speed? Who designed her? How many miles per gallon of gas? What sort of engine does she have? What's the price tag? . . ." Twelve hours a day



The SS 11 of 1933 had a 79 cubic-inch flat head engine, taxed at 12 hp, had room for four, and was one of Sexy's short-lived smaller descendants.

Aligned hub to hub in herringbone pattern, this shipment of prettified Swallow Austin Sevens started William Lyons in business in pre-SS days as a custom body specialist.

AND THE SEXY 6

the drumfire questionnaire ran on.

By no means were all of Mr. Lyons' Olympia visitors ready to reach for their check books, of course. Roughly, they were divisible into three categories: first, the publicans and sinners element—avid for something that went in and came out in becoming places, and prepared to settle for a mediocre performance so long as the thing *looked* like a thousand pounds sterling and a hundred miles per hour; second, a class of waverers who sneakingly admired the SS's avant-garde looks but weren't sure of its impact on family and friends back home in stuffy Exeter or Harrogate; third, the sworn adherents of such pedigree strains as Bentley, Lagonda, Aston Martin and Alvis, who came only to make derisive noises and coin unkind nicknames.

Nonetheless, Mr. Lyons had taken a sure-footed stance on the springboard that would eventually catapult him to knighthood and a progression of Le Mans triumphs that only Bentley has ever surpassed. Before Olympia closed its doors the biggest car distributing company in the United Kingdom was wooing him—in vain—for the whole of his first year's output. "Half," he said, "yes; the lot, no."

At a hindsight range of twenty-five years it is easy—too easy, to be snide at the expense of the Jaguar's dressy ancestor. Sure, it was "weak to perform though mighty to pretend," like whatever it was in Cowper's poem. Sure, the ratio of hood length to habitable *lebensraum* was something that a caricaturist rather than a designer might have dreamed up. Sure, there was almost room under that far-

reaching hood for a spare engine the same size as the one that did the work. Yet, measured against the yardsticks of its day, there was something to be said in extenuation, if not actual praise, of this sheep in wolf's clothing.

By slow degrees, it and its successor models did more than any other car of the inter-wars period to snap the British motorist out of his conviction that true worth and ugliness necessarily went hand in hand in car design.

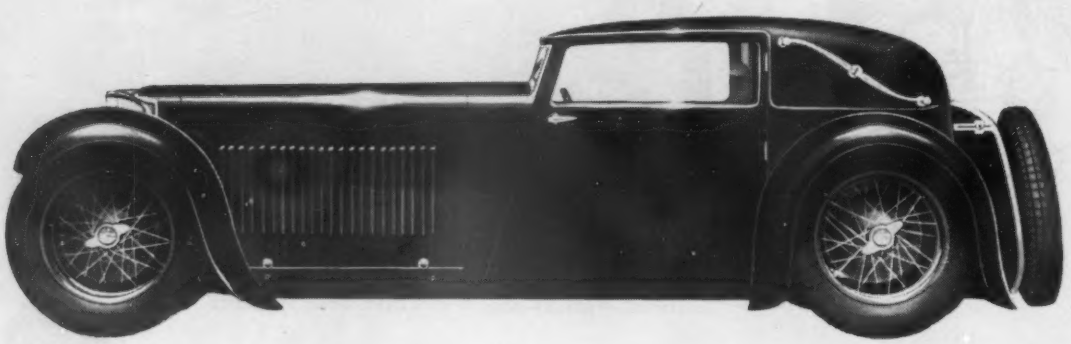
A stock jibe in the whispering campaign that old Sexy's advent set off was that the body, while admittedly pretty in rather a common way, effectively blinkered the dudes within, leaving them to navigate by guess and by God. But this was a tale that riding experience belied. In all directions except aft—and nobody, in that day and age, expected to be able to see astern—visibility was anyway equal to average contemporary standards.

Finally, even granting that Mr. Lyons made concessions to the phony in pursuit of his aesthetic ideal, at least it was a phonyness of *shape* and not of decoration. Unlike latter-day stylists in a hemisphere that shall be nameless, he didn't measle his product with chromium blobs and streaks. By 1931 his artistic sense had even developed to the point where he was willing to, and did, forego the marine type cowl ventilators which had been a Lyons hallmark on the custom bodies he had built for established *marques;* Austin, Fiat, Swift and Standard among them.

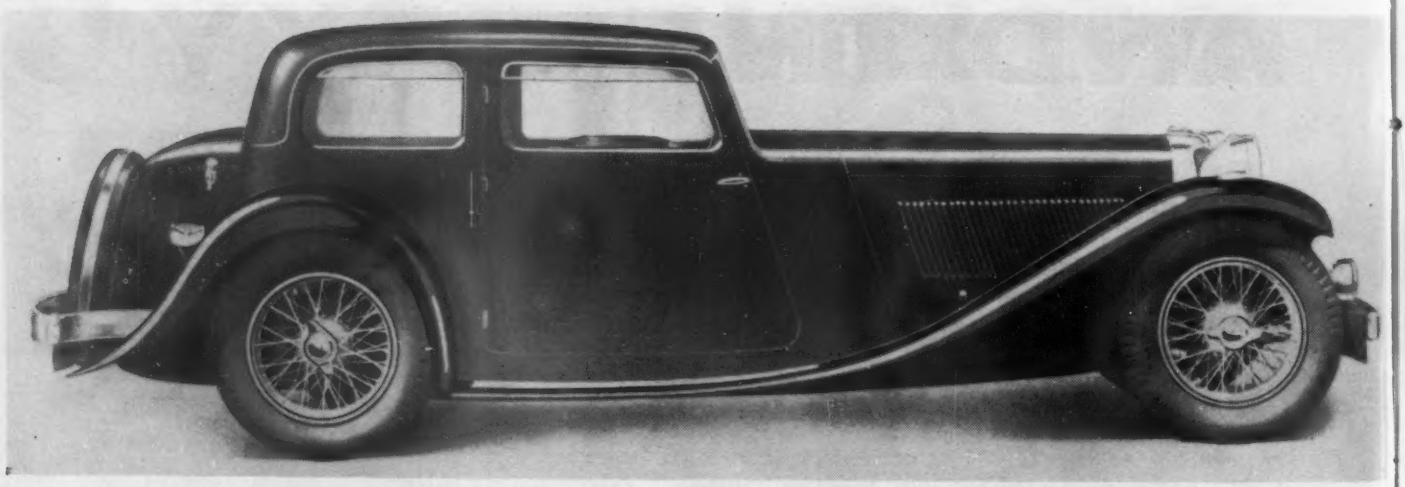
The SS grew directly out of the body building association with Standard, which in turn had marched concurrently with the enterprise that set the 20 year-old Lyons up in business back in 1922, namely, the construction of sidecars. His original company was known as the Swallow Sidecar and Coachbuilding Company, and it was this concern, under the same title, that launched the SS car in '31.

With the facilities and finance at his disposal, William Lyons was not in a position to construct an entire car, from beginning to end. He therefore sought the cooperation of a Coventry manufacturer with a ready-made engine of a displacement and performance suitable for his purpose, and who would be prepared to lay down chassis conforming with the singular SS body blueprint. This man was Captain John Black—later to be knighted, too, incidentally—who had recently rescued his own company, Standard Cars, from threatened extinction. Black, an adventurous soul if not exactly a *marque* 1 world's sweetheart, came along gladly.

The engine he provided was an L-headed six in optional capacities of 2054 and 2552 cc; the stroke being the same for both sizes (102 millimeters) and the bores 65½ or 73 mm. In its Standard form this plant could hardly pull a plover off its nest, but with a main bearing between each throw of the fully balanced crank it did have an uncommonly smooth and pleasant power flow. Duralumin con rods were used and for bonus performance SS added an aluminum alloy cylinder head, raised the compression and



The skeleton in Jaguar's closet, Sexy herself. "Convertible" top didn't convert, Landau irons were phonies and the car didn't go but the beast mothered a mighty brood.



The second season SSI with back seats and rear quarter windows added was powered by either a 2 or 2½ liter engine at option.

The squat 3½ liter SS100 skids through the mazes of a rally test. This pre-war Jag brought 100 mph motoring into the reach of middle-class British incomes. Yet, while the speed was there, handling at over eighty wasn't, and the less experienced operators preferred to jog along at more reasonable speeds.

fitted a special carburetor and manifolds.

The frame Lyons bought from Black was drastically dropped in the midsection and carried the engine much farther back that the corresponding Standard model. After an early dribble of production with a plain ladder-type chassis, center cross bracing was rigged in with beneficial results. A four-speed synchromesh gearbox, in unit with the engine, came as part of the Standard deal. SS modified the shift to incorporate the fashionable remote-control lever. Suspension was by flat springs lying alongside the frame longerons and the brakes were of the bendix duo-servo pattern—with their well-known aversion to any position between full off and full on.

Having created a car that looked practically supersonic, Mr. Lyons was undestandably reluctant to admit it was quite as slow as it was. He claimed a top speed of 70 miles per hour, but a *Motor* road-test could only make 65. The take-off wasn't exactly spine-breaking either. Another *Motor* report on a later and better example, gave a zero to 65 time of 31 seconds—"a really outstanding performance," applauded the writer. A crystal ball being no part of his test equipment he naturally couldn't know that slightly under a quarter a century later the fastest descendant of Mr. Lyons' long-nosed gallumpher would be going from nothing to 100 in a decimal over 12 seconds—*vide* Russ Kelly on the D-type in the August '56 issue of Sports Cars Illustrated.

With the march of time the SS began to look more like a car and less like an amusing doodle on a spare envelope. Rear seat accommodation in the coupe that founded the line had been what the English call "occasional"—meaning that passengers wore the rear seat like a tourniquet rather than sitting in it. Then the wheelbase was extended by a further eight and one half inches—making room for a proper sedan body of comfortable proportions.

Contrary to the usual result which occurs when idealists compromise with a cherished concept, these changes brought a great improvement in all-around appearance. The introduction of glass windows flanking the rear compartment, and the concomitant junking of those futile Landau irons, lent the whole ensemble a new harmony.

From then on, SS's were regular prize winners in the *concours d'elegances*—an incongruously genteel prelude to Jaguar's subsequent prowess in "hardy sport and contest bold." Usually with either a plain black or dazzling white paint job, set off by chromium plated wire wheels, these *concours*—haunting SS's had a chic look that stopped even the most bloody-minded judges in their tracks.

The six-cylinder car was not an only child. Its Olympia debut in October of '31 had been shared by a smaller model with a four-cylinder Standard engine of one liter displacement—also mounting a coupe body. Official titles of Big Sexy and Little Sexy were SSI and SSII respectively. Little Sexy later gave place to an in-between with a choice of capacities—1.3 or 1.6 liters.

(Continued on page 51)

SCI

Thunderbird for '57 has been redesigned and reengineered with more power than ever before... it's also further from Sebring than ever before.

DRIVERS REPORT: the 1957 Thunderbird

Basic T-Bird body lines are still visible. Heavier bumper-grille and flared fender add flash.

By KARL LUDVIGSEN

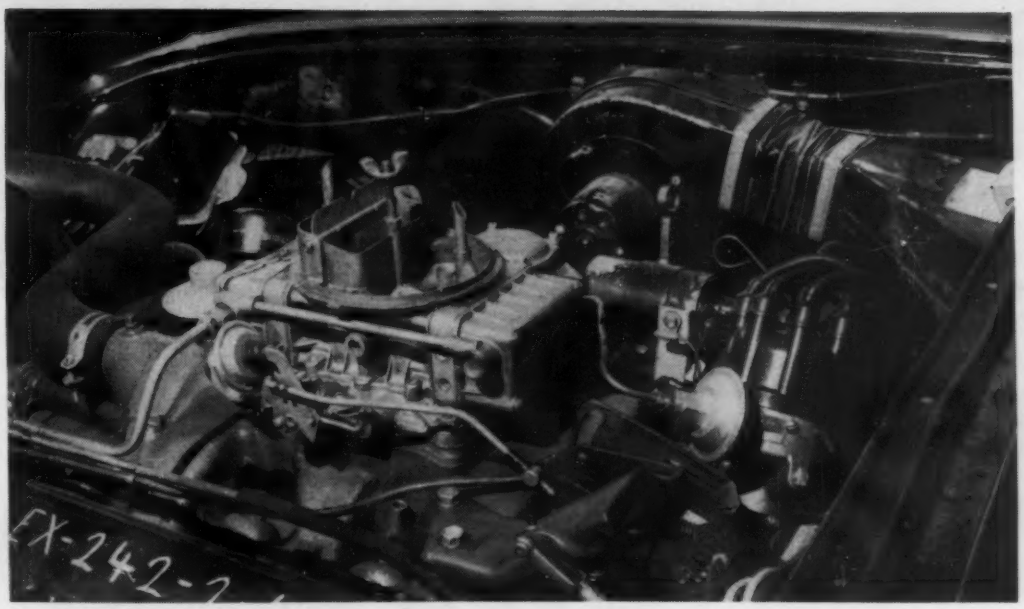
YOU don't have to be told first—a quick glance at a Thunderbird instantly reveals its ancestry. The first Bird prototype was based on a shortened standard Ford chassis for exploratory purposes. This was a valid start, and later versions never wandered very far from this concept. For production and servicing ease, it made sense to build a Bird out of the FoMoCo parts bins. Sense or not, this goes a long way toward explaining the nature of Ford's "personal car."

As indicated in Sports Cars Illustrated's road test of the 1956 Thunderbird, the car is a compromise resulting from sports car looks on a workday chassis. Ford's interpretation of the appeal of the sports car puts emphasis on the exclusive feel of two small seats in a big automobile. They enhanced this in 1956 by hanging the spare tire out back, and for 1957 the major change has been the grafting on of long canted tail plumage for the Bird. The spare has been tucked back inside, and with it have gone a lot of trunk access problems.

The additional rear overhang was handsomely handled, and the bumper treatment is pleasantly clean. It all contains a huge luggage compartment which is marred only by the inward-angled spare tire. The fuel filler has been moved from the center to the right side to exploit the new space further.

A clever tie-in was achieved by curling the fender peaks around the door-handles, while the new front bumper-grille has a commercially massive look. Otherwise the sheet-metal is unchanged, but with the louvered wheel discs this is probably the jauntiest T-Bird yet. And we haven't even mentioned the greatly expanded color range, which includes two exclusive Bird colors: light pink and metallic copper.

If the hardtop portholes have started to pall, an unpunctured version is optional equipment. Clamping for the hardtop has been revised, and the convertible mechanism modified to make operation considerably easier. Two years'



Latest squat Holley 4-barrel is wide open & spread out. Choke on primary is visible, as are separated float chambers. Throttle linkage heavy & complex for shift control.

Bird interior is handsome and safe, but tach is low at left. Dished wheel and dash pad are standard.

exact position pre-selected on the two dials. The T-Bird is not hard to get in and out of, but this gimmick ensures that the entry condition will always be the best possible. Moreover, if husband and wife both use the car they can avoid groping for the proper location by pre-setting their personal combination. If this were a sports car we would laugh, but it's a neat tailoring trick for a personal car. It's also a harbinger of similar gadgets for lower standard cars.

Power assists are again optional for the side windows, but the padded panel and sun visors are now standard. Covering materials have been chosen to give maximum windshield glare, and instrument lights are completely shielded by a wide, deep cowl. The dials themselves are handsomely round and fully visible with the wheel in straight-ahead position. In a turn, the horn ring suddenly confuses things. The sweep-second clock and the 5000 rpm

(Continued on page 48)

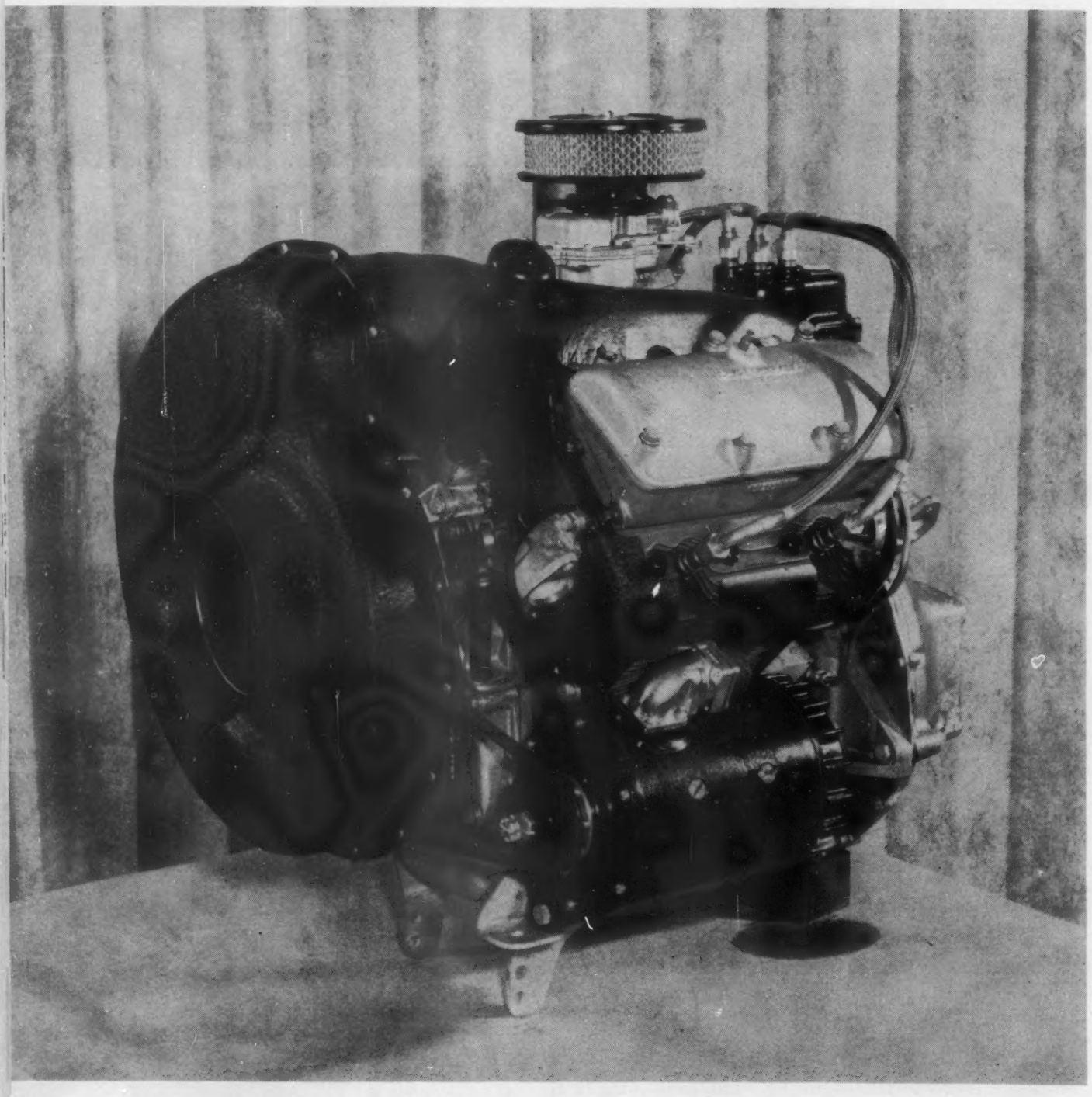
experience has also led to heavier door hinges. Seats in the old Thunderbird never won much praise, and without any change in shape or bulk the new ones have been made much more comfortable. Separate sections for driver and passenger are sprung to give much better adaptation to the spine and deceptively good side support. Cushioning over the drive shaft has been retained to make life easier for a third passenger.

Interior adjustability has always been a good Bird feature, and the engineering prototype we drove at the Detroit proving grounds had the adjustable steering wheel and four-way power seats. It didn't have the new Dial-O-Matic seat control which is, nevertheless, worth mentioning. This is controlled from the dash by two concentric numbered knobs: one for horizontal and one for vertical positioning.

When the ignition is turned off the seat automatically moves as far back and down as it can go. Turning on the ignition causes the seat to move forward and up to the

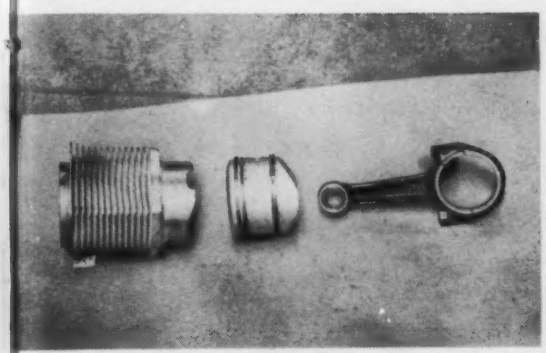
Those tail-lights will be blinding but visible, and the concentric backup light is neat. Exhaust is well integrated.

American Motors'



Military requirements dictated the heavily shielded ignition cables and oversized generator. Small elbows carry exhaust away. Visible on front cover are the dipstick and oil filter, while the transmission adapter plate can just be seen.

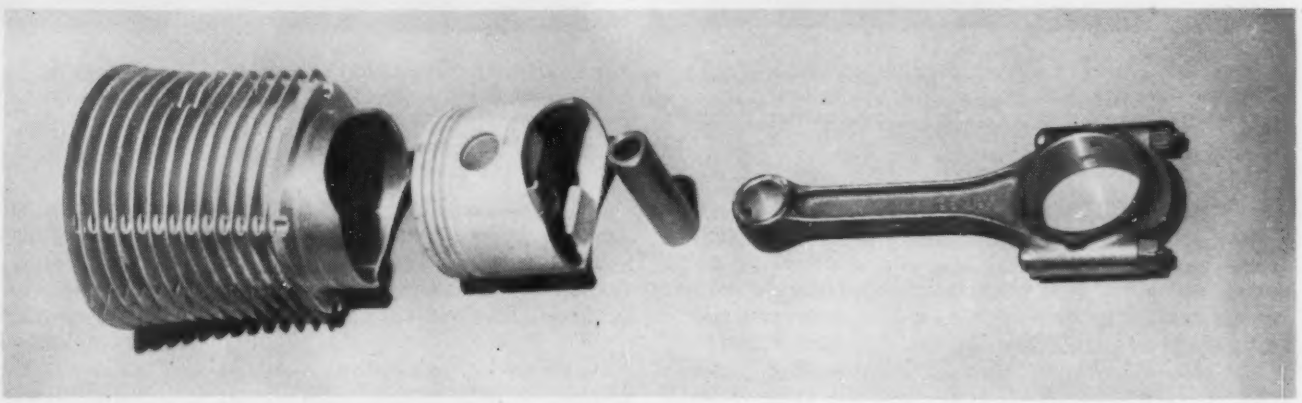
New V-4...



Porsche cylinder group resembles AMC parts below. Rod big ends differ.

...the first U. S. built automotive air-cooled engine since the day of the Franklin. Here is an exclusive SCI report on the newcomer.

BY KARL LUDVIGSEN



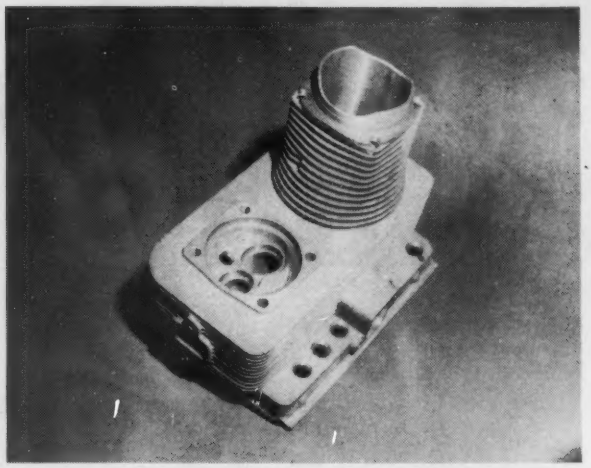
Con rod shank is a shade slender in relation to length, but bearing cap is healthy. All rings are above wristpin hole, in which circlip groove can be seen. Cylinder fins are drilled for hold-down studs, and are deep at top.

ONE of the things the American automotive industry lacks is a good small-displacement sports car engine. The AMC V-4 isn't it yet—but it might be. England lacked one too, not so long ago, and a rough silk purse was hewn out of a very fine sow's ear in the form of the Coventry-Climax four. Germany had the same problem after the war, and was rescued by Ferry Porsche's clever development of his father's rugged VW engine. In neither case (excluding the ultra-ultra four-cam Porsche and a possible DOHC Climax) was the end result the ultimate, but they kept a lot of sports cars going fast enough for long enough to encourage their makers to turn wide the taps on full racing versions.

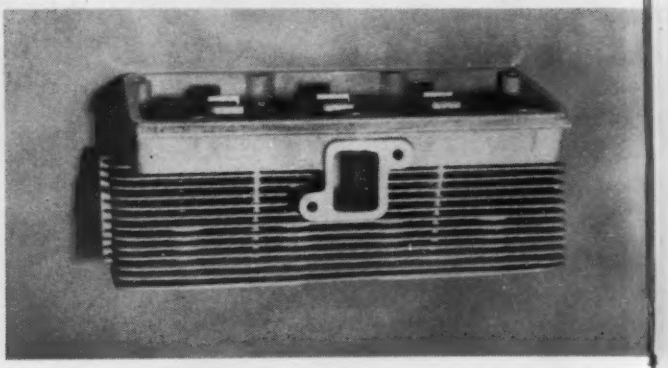
Both the above engines were first conceived as hard workers over long hours with minimal fuel costs and upkeep; light weight being an additional goal. This gave them high strength/weight ratios to begin with and left a lot of room for improvement at the top end. Intended mainly for military and industrial use, American Motors' new V-4 fits right into the pattern. Their engineers see these power-plants showering from the skies inside Marine "Mighty-Mites" and similar airborne vehicles, as well as donning civvies to turn pumps and generators.

AMC Engineering has taken over from Research for detailing and dyno testing, and the present Third Series engine winds up experimentation that began before the war. In cooperation with Alcoa, aluminum has been used extensively, with all such parts except the pistons and the intake manifold being adapted to die casting techniques. This has dictated some design details, as have the very

Rear main bearing cap is brutally massive, and seals crankcase from clutch housing. Opening above bearing houses oil pump and feeds adjacent connections.



Combustion chamber has good "squish" & turbulence contours. Heavy counterbores await both valve seats and cylinder top end.



Head finning is close-spaced and deep. Single intake port is modest in size, and warms charge while limiting peak power.

specific and rigid Ordnance requirements.

Basic module of this clever lightweight is a single-cylinder assembly, or, more correctly for this application, a 90 degree vee assembly of two cylinders. These are offset enough to allow separate assembly of two cylinders. Stroke/bore ratio is squared up at 3.25 x 3.25 inches, or 82.5 x 82.5 millimeters. In V-4 form the displacement is 108 cubic inches or 1770 cc, and V-2, V-6 and V-8 mills are projected. In order, these would contain 54, 162 and 216 cubic inches, or 885, 2655 and 3540 cc. Since the V-4 is the only unit that's materialized into any hardware, we won't worry about the others except to mention that only seven basically new parts are needed for each one: rocker cover, rocker shaft, head, camshaft, crankcase, crankshaft and sump.

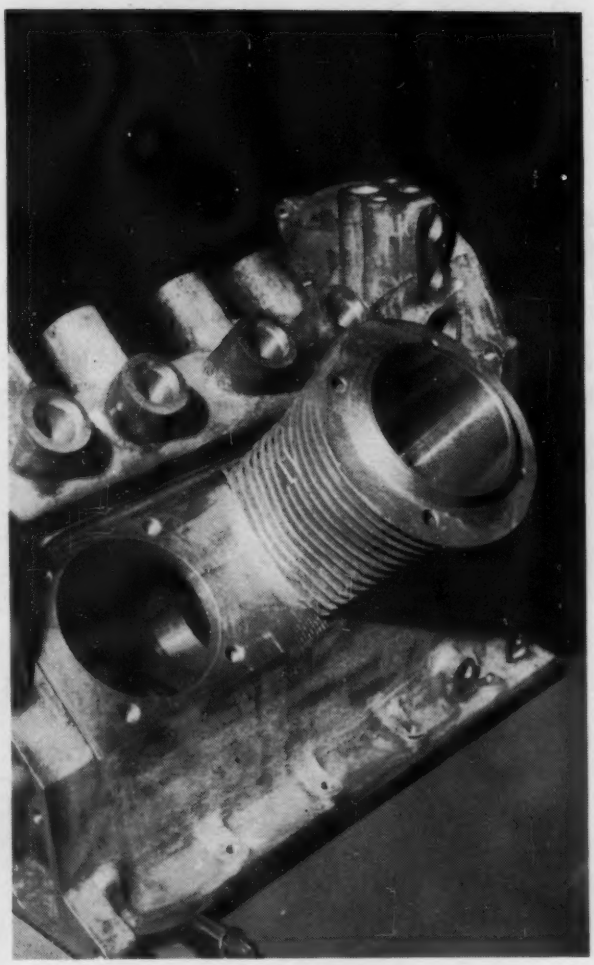
1770 cc. is a pretty discouraging figure, and a little slide rule pushing shows that a brutal destroking to 2.75 inches would bring it down into the 1.5 liter Class F and allow 7650 rpm. at a piston speed of 3500 feet per minute. This would call for a new crank, and it might be easier to turn up some new cylinders with a bore of 3.44 inches, to move up to the top of the two-liter class. It could be hot either way, so it's definitely worth some study.

Heart of the engine is the cast-aluminum crankcase, which is very compact and shaped like a squat house with a gable roof. The sides and ends extend down several inches below the crankshaft center, and with substantial internal bracing they give good support to the three main bearings. Deep aluminum caps for these are located at each side by small matching flats in the crankcase, and are tied in by two bolts. A U-section steel strap strengthens the center main. Projecting from the "ridge pole" at the center are eight cast extensions which house the cam followers, just above the single central camshaft.

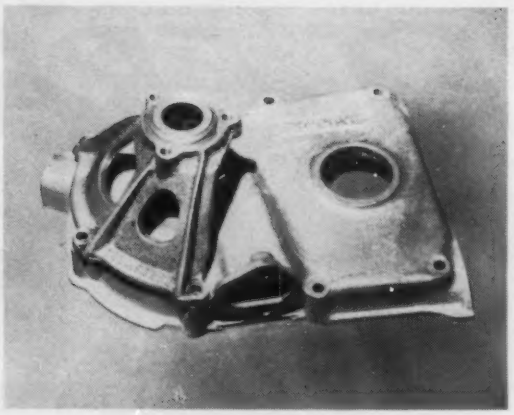
The cylinder construction is imaginatively simple, and will be familiar to students of the Porsche air-cooled designs. Each cylinder is an aluminum tube with cast fins which are shallow at the bottom end and deeper near the head joint. The bores are plated with from .003 to .004 inches of chromium and lightly finish honed. At the top the outer diameter is clear for $\frac{3}{8}$ of an inch, and this fits a similar counterbore in the head around the combustion chamber. A small flange at the bottom meets the machined face of the crankcase through a thin copper gasket while a relieved extension spigots into a $3\frac{1}{2}$ inch hole in the crankcase.

It's an interesting coincidence that the bore of this cylinder is identical to that of the 1600 Porsche and that the designs are very similar. This can lead to tantalizing conjecture—one chance being that the use of Stuttgart cylinders might help shrink the engine for destroking. If the 2.94 bore of the 1300 could be fitted, though, severe crank changes would not be a Class F necessity.

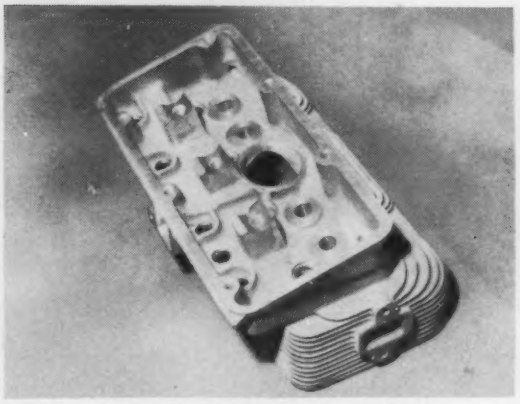
Head, cylinder and crankcase are three separate pieces, then. What holds them together? A classic solution. Four alloy studs undercut to a diameter of $\frac{3}{8}$ of an inch surround each cylinder. They screw into the crankcase, pass



Alloy center main cap seen thru hole for cylinder spigot. Cam and follower housing is unique, does not need to carry oil.



Support bracket for cooling blower bolts to timing cover. Opening on near side is for fuel pump drive lever.



Far rocker support carries oil to valve gear. Center opening, normally closed, is ideal entry for new carburetor.

through holes in the cylinder fins and protrude above the head to accept nuts. The head and crankcase are thus directly tied together with the cylinder acting as a spacer. There's no head gasket now, though for higher outputs a copper ring compressed into matching grooves might help maintain the seal.

Also, small compression ratio increases can be made by carefully trimming the top end (instead of weakening the bottom flange), while more drastic shortening would go well with destroking. New through-studs for the AMC four shouldn't be necessary since the standard ones are carefully matched to the expansion characteristics of the aluminum cylinder. In any case a steel stud would expand less than the aluminum and only tighten things up excessively when they got warm.

Permanent-mold casting is used to form the aluminum pistons, which are flat-topped and full-skirted except for mild cutaways for the crankshaft counterweights. This would present problems when destroking. The skirts are cam-ground to a very slight taper and clear the walls by .0015 of an inch. Two iron compression rings are carried, each running in a groove .080 of an inch wide, while the single expander-type oil ring fits in a .189 of an inch groove. Just below these, the pistons are slotted on each side.

Spring circlips retain the $^{13}/_{16}$ of an inch full-floating wrist pin, which is slightly offset and turns in a bronze bushing in the con-rod little end. The rod itself is drop-forged steel and measures 5.81 inches from center to center. The well-proportioned H-section broadens into a conventional two-bolt big end. No rod drilling is done, splash oil for the wrist pin and upper cylinder being supplied from a jet in one side of the big end.

A general impression of huskiness given by the piston and rod isn't belied by the steel crankshaft, which is a handsome piece of work for such a utilitarian engine. The three mains are closely spaced and the four rod journals are far from narrow, so some sections of the crank look "real racing" in their compact angularity. To add to this the AMC engineers wanted full counterbalancing, and the resulting design was too intricate for the drop forging process used. The body of the crank is thus forged and the two biggest counterweights are separately machined and tied in with two bolts each. This could be a big help to a later, more accurate balancing job. Healthy in size, the main and rod journals overlap slightly and are fitted with trimetal bearings.

Lying just above the crankshaft, the cam is driven from the crank nose by a phenolic gear. Forward of this is the drive cam for the timing-cover-mounted fuel pump. Placed between the gear and the cam, though, is the Gerotor pump that powers the engine's neat lubrication system. A fixed screened pickup draws oil from the center of the stamped steel four-quart sump. After leaving the pump the oil enters the drilled passages of a compact tower above the pump. In sequence, this tower contains the relief valve, connections for either a bypass (now used) or a full-flow filter, and the

(Continued on page 49)

JET ERA SPORTS CAR

Conventionally styled except for high rear deck, body shell of the Rover T-3 hides the first ready-for-production gas turbine power plant and chassis. New sports coupe is the result of more than 7 years testing by the small company.

WHEN the Rover Company of Coventry, England introduced their new gas turbine car T3-at the Earl's Court International Motor Show—London, in October, it indicated that great strides have been made in the technical development of turbo transport since Rover announced their first "jet" car in 1950.

That car, registration number Jet 1, was as the name implies, the world's first car to be propelled by a gas turbine power-unit. Rather bulky in appearance with open cockpit and definite "experimental" look, it was setting new (and first) world speed records on the Belgian Jabbeke Highway by 1952. Several records were set including the flying mile at 151.196 mph; since beaten by Renault's Shooting Star (see Sports Cars Illustrated, October, '56).

Jet 1 had a largish turbine which although it produced a great deal of power, suffered from the usual turbine bogey of high fuel consumption. The car proved its worth however and by 1953 so much had been collected on the behavior of turbine units that the Rover company marketed a new, small stationary industrial engine designated IS/60 which has since gained an international reputation for smooth, reliable power and extreme mobility. It is marketed by Rover Turbines, Ltd., a subsidiary of the main company.

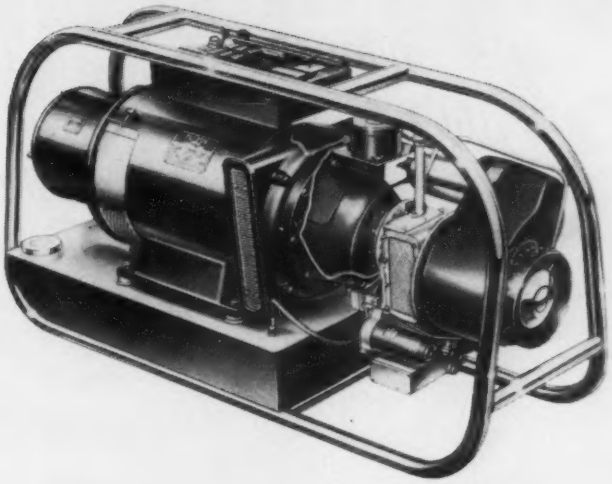
In August '55 a similar turbine was installed in the trunk of a near-standard looking Rover sedan, and with 120 developed horsepower, the car was a sprightly performer. Rover, however, was only making its slow but sure way towards a practical turbine car and it is most interesting to learn that the small company's latest development is modeled on "Gran Turismo" lines i.e., a luxury car with sports car characteristics.

The two-door plastic bodywork is striking, but the observer cannot help feeling that a happier line would have been achieved if the roof had been continued in a steady sweep down to the tail *a la* Lancia Aurelia Gran Turismo. It is possible that thermal problems prevented this, but the T3 is obviously still in the prototype stage and the ultimate production model may be more shapely. The interesting point is that the Rover Company says that it will be difficult to produce the car for less than $7000 which is comparable to prices that wealthy enthusiasts are currently paying for "something different" and the T3 certainly whines into that category.

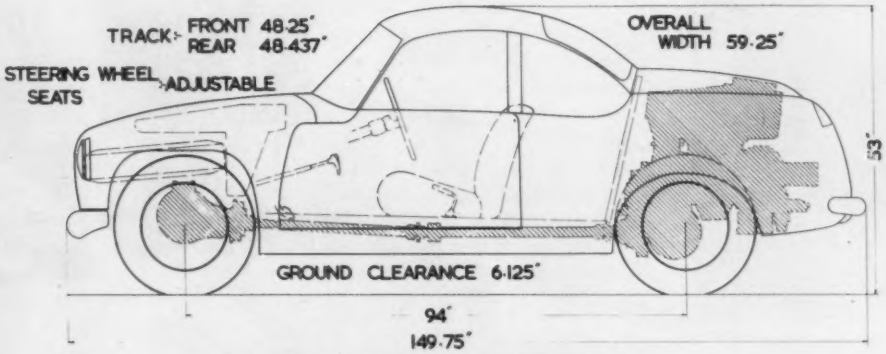
Important feature of the new car is that it was designed to take full advantage of all the many features which make the turbine power-unit so attractive. Main advantages are the light weight of the engine in relation to its output of 110 bhp (at 52,000 rpm!), absence of radiator, clutch and multi-speed gearbox.

The engine has been developed from the IS/60 industrial turbine which has a single-stage centrifugal compressor driven by a single-stage axial turbine, redesigned so that it absorbs only sufficient power from the gas stream

First with an experimental G-T-powered passenger car, the Rover people are also the first with a limited production turbine sports type coupe.



Rover IS/60 gas turbine industrial unit upon which the T-3's mill is based. Engine here is coupled to a portable generator. Note apparent small size of power plant as compared to size of generator unit.



ROVER T3 GAS TURBINE CAR

The lightweight 110 bhp turbine engine is installed well back in the car and drives four wheels to take advantage of the high torque to weight ratio.

By ALBERT DOUGLAS

to drive compressor, and fuel and oil pumps. A second single-stage power turbine has been added which accepts the remaining power from the gas stream and drives, through a 7.45 to 1 reduction gear, the front and rear units of the four-wheel-drive transmission.

The reduction gear also incorporates a reverse gear selected by a central control lever. Four-wheel-drive is considered by the manufacturers to be a safety factor with the car's high torque/weight ratio, the drive to the front wheels being transmitted through a free-wheel similar to that fitted on the early Land-Rovers (Jeep-type all-purpose vehicle).

An efficient heat exchanger of the secondary surface, contra-flow, plate type is mounted on top of the engine where it accepts exhaust gas heat to warm the compressed air before it enters the combustion chamber. The exhaust is ducted at around 200 degrees centigrade to a rectangular aperture in the boot lid which also incorporates an ejector orifice for engine compartment ventilation.

At maximum revs (52,000) at which the unit attains its 110 bhp, a pressure rate of 3.85 to 1 is maintained with a maximum temperature of 850 degrees centigrade and an air mass flow of two pounds per second—impressive figures.

Starting is carried out with a 12 volt electric starter motor which drives the compressor shaft through a ten to one step-up ratio and is then cut by an electrical switch operated by compressor pressure at the self-sustaining engine speed of 15,000 rpm. Speeds in excess of this figure are controlled solely by an accelerator pedal, movement of which is transmitted hydraulically to a lever in the engine fuel system. This varies the setting of an all-speed centrifugal governor which also limits the maximum speed. The remainder of the car's electrical system is conventional, with generator driven from the transmission.

Naturally, a company with the standing of the Rover organization has closely studied the safety aspect of this exciting and promising form of power-unit. In the event of failure to "light" (GT language equivalent to "fire" in piston engine parlance), surplus fuel is drained from the combustion chamber and engine casing by means of an automatic air-operated valve in the bottom of the main casing.

Such is the efficiency of the heat-exchanger that fuel consumption figures are as follows: 13.8 mpg at 40 mph, 14.3 mpg at 60 mph, and 12.8 mpg 80 mph. These figures at least bring the turbine car into the category of realistic fuel consumption, for the kerosene fuel on which the turbine operates costs less than half that of premium grade gasoline in the British Isles. Judging by other experiments both in the U.S. and abroad, they could just about make the thing run on old socks if they had to.

It cannot be argued either that the T3 is a sluggard since tests on the Motor Industry Research Association's proving

(Continued on page 47)

Out to take back their records, lost a year ago, MG did the job in spades. Just to round things out, Austin Healey raised their own marks too.

Photos by Dan Rubin

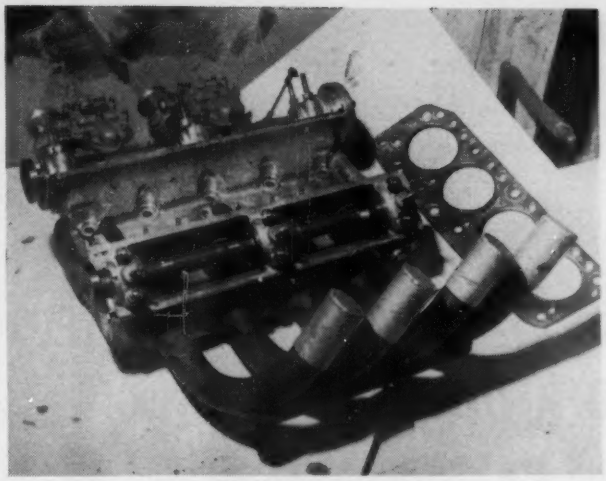
EX 179 howls past the happy MG crew as the 500 mile record is racked up. Lines marked in salt guide cars around big circle.

EX 179: the MG that rewrote the record books

LAST August, in their share of what is probably the busiest season the salt has even seen, the British Motor Corporation established 88 new national and international records in classes F and D with MG and Austin-Healey cars.

In spite of the fact that the present BMC organization has more practical experience in record breaking than any other firm in the world, this session was a succession of frustrating incidents. First, the Austin-Healey straightaway streamliner shed a blower drive chain on a practice run. The first attempt by MG on the 12-hour record was halted after six hours by mechanical difficulty. Then, when the Austin-Healey distance car attempted the six-hour record, fuel troubles caused this run to be postponed also. In addition to these difficulties, conditions of the salt were far from good with the ever-present threat of rain.

Wendover's air-conditioned cafe is the chief gathering place for off-salt hours. Here, in only a few hours, you become aware of the tremendous amount of automotive know-how available to BMC—Captain George Eyston, who has devoted his life to record breaking; Alec Hounslow, with more than thirty years in the MG racing and experi-



Just the thing for your MGA. Always referred to as "experimental", the twin-cam MG head is rugged and simple. Tuned exhausts are fine for the flats.

mental department; Geoffrey Healey, Donald Healey's son, who has, of late, had more than a little to do with the experimental development of Austin-Healeys; Johnny Lockett, world-famous motorcycle rider who has driven Austin-Healeys and MG's so impressively at Le Mans, and some of the finest of America's driving talent in the persons of Ken Miles and Carroll Shelby.

On Sunday, August 12, the 1500 cc MG made its first attempt for the 12-hour Class F record with a target speed of something over 140 mph. Concern had been expressed over the condition of the salt which was never too stable at best. If the salt was wet, it meant pit stops to break loose the salt that would pack up in the fender wells—and pit stops cost time.

If the course deteriorated in one section, it meant that speed would have to be higher over the remainder of the course to maintain the necessary average. On this morning, Ken Miles took the opening session of three hours beginning at six a.m. Not yet too light at this hour, the only thing that seemed real was the sharp crackle of the exhaust as Miles moved off.

Three hours passed with the speed well above what was necessary to break Bettenhausen's 1955 record in the OSCA special. At a few moments after nine o'clock Johnny Lockett took over and not even the most tense or critical ear could pick up a sour note that would give warning that this engine wouldn't run forever.

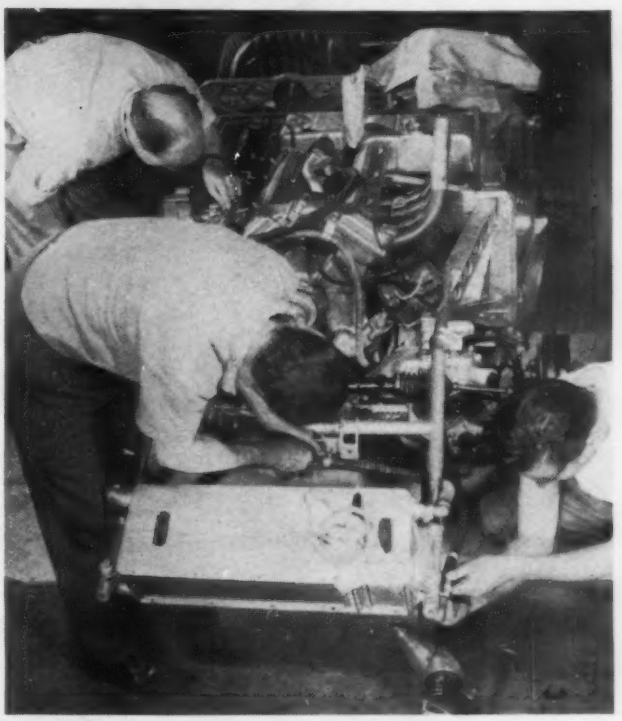
As noon approached and Miles prepared to relieve Lockett, the unforeseen happened. A rear wheel bearing let go, allowing the axle to drift out of the housing. Lockett reported that he had just caught the first hint of burning rubber when the revs mounted due to the spline in the axle leaving the differential carrier.

The rear-wheel well skirt was all that had prevented the wheel and axle from leaving the housing entirely and this had been responsible for the smell of burning rubber. Six hard-earned hours of record speed were wasted as far as the twelve-hour goal was concerned and the engine that a few minutes before had only a little over six hours to run now had an additional twelve.

On Monday a new course was prepared (under the supervision of Captain Eyston) for the Austin-Healey Class D distance run of six hours scheduled for Tuesday. Tuesday did not dawn bright and clear. A few scattered drops of rain only a few moments before the six o'clock start seemed to promise more rain before the day was over. In fact, the grey veil of a rainstorm obscured the horizon to the east.

At six o'clock on the dot the car started its run. The

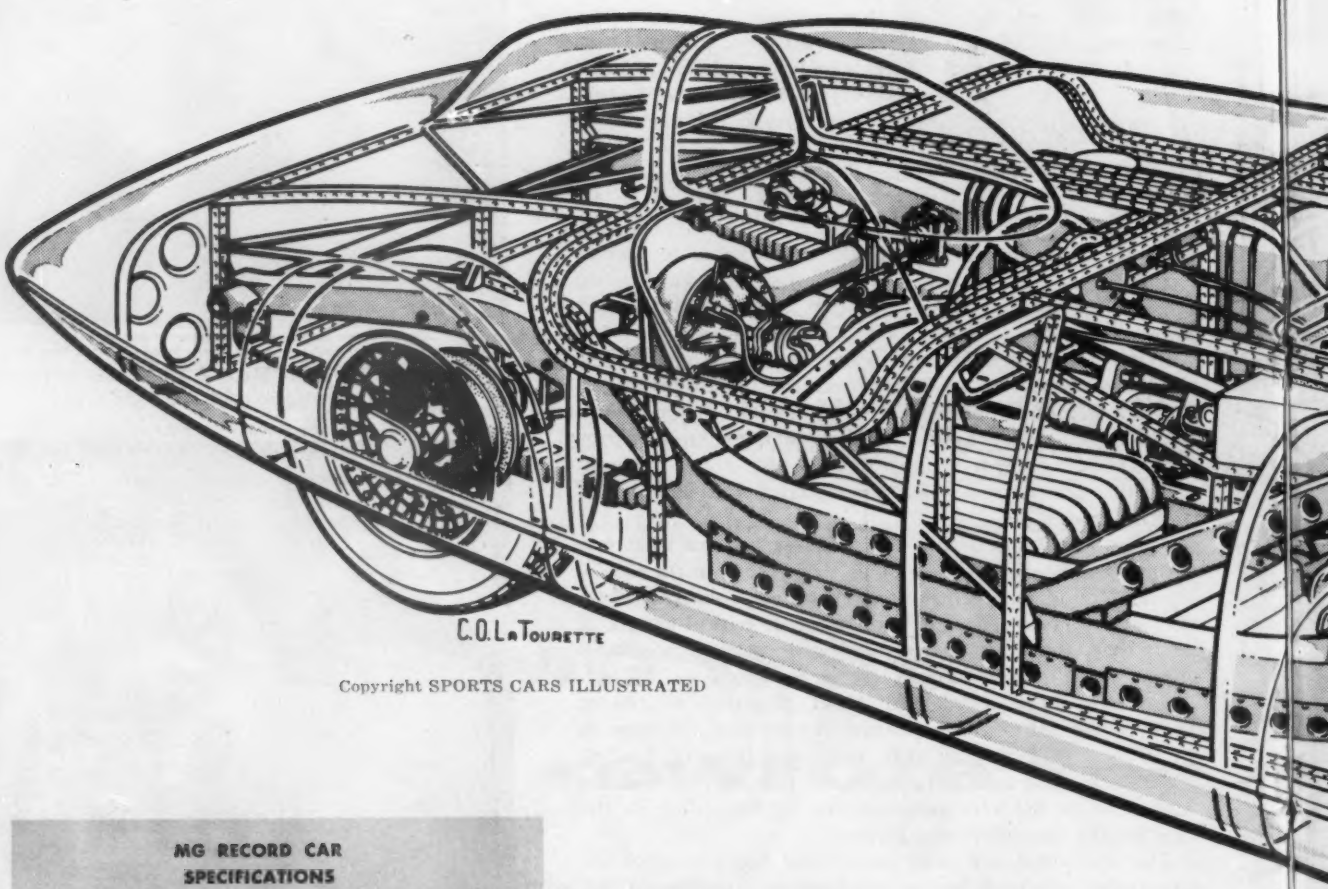
The chassis is ready and the crew lowers the self-supporting body in place. Twin ducts carry air up and away from the oil and water radiators.



Oil cooler connections are potential trouble sources, and get last-minute checking here. Low front radiators require reservoirs at cowl.

EX 179

75 NEW RECORDS FOR MG



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MG RECORD CAR
SPECIFICATIONS

BODY: Overall length	**188⅞ inches**
Overall height to top of driver's cowl	**40⅝ inches**
Overall height to top of scuttle	**31 5/16 inches**
Overall width	**63½ inches**
WHEELBASE: 95 inches	
Front tread	**47⅝ inches**
Rear tread	**48½ inches**
FUEL TANK: 30½ gallons	
FUEL RESERVE WARNING: 4½ gallons	
TAP RESERVE: 2½ gallons	
DRY WEIGHT:	
no oil, water or fuel	**Total: 1538 pounds Front: 893 pounds Rear: 648 pounds**
with driver, oil, water and fuel (30 gallons)	**Total: 1964 pounds Front: 1077 pounds Rear: 887 pounds**

*MG CLASS F SPEED RECORDS

August 18, 1956

DISTANCE	INTERNATIONAL STANDING	NATIONAL STANDING	NATIONAL FLYING
25 K	*	142.38	155.04
25 M	*	146.90	155.02
50 K	148.39	148.39	155.05
50 M	150.89	150.89	155.13
75 K	*	150.39	155.11
75 M	*	152.39	155.24
100 K	151.75	151.75	155.24
100 M	153.12	153.12	155.34
200 K	153.66	153.66	155.43
200M	154.30	154.30	*
250 K	*	153.99	155.38
250 M	*	*	*
300 K	*	154.22	155.39
300 M	*	142.96	143.46
400 K	*	*	*
400 M	*	143.12	143.51
500 K	142.97	142.97	143.45
500 M	141.17	141.17	141.47
1000 K	141.66	141.66	141.91
1000 M	141.46	141.46	141.61
2000 K	141.86	141.86	141.97

INTERNATIONAL

Time	Distance	MPH
1 hr.	153.98	153.98
3 hr.	429.2614	143.09
6 hr.	853.6681	142.28
12 hr.	1700.5653	141.71

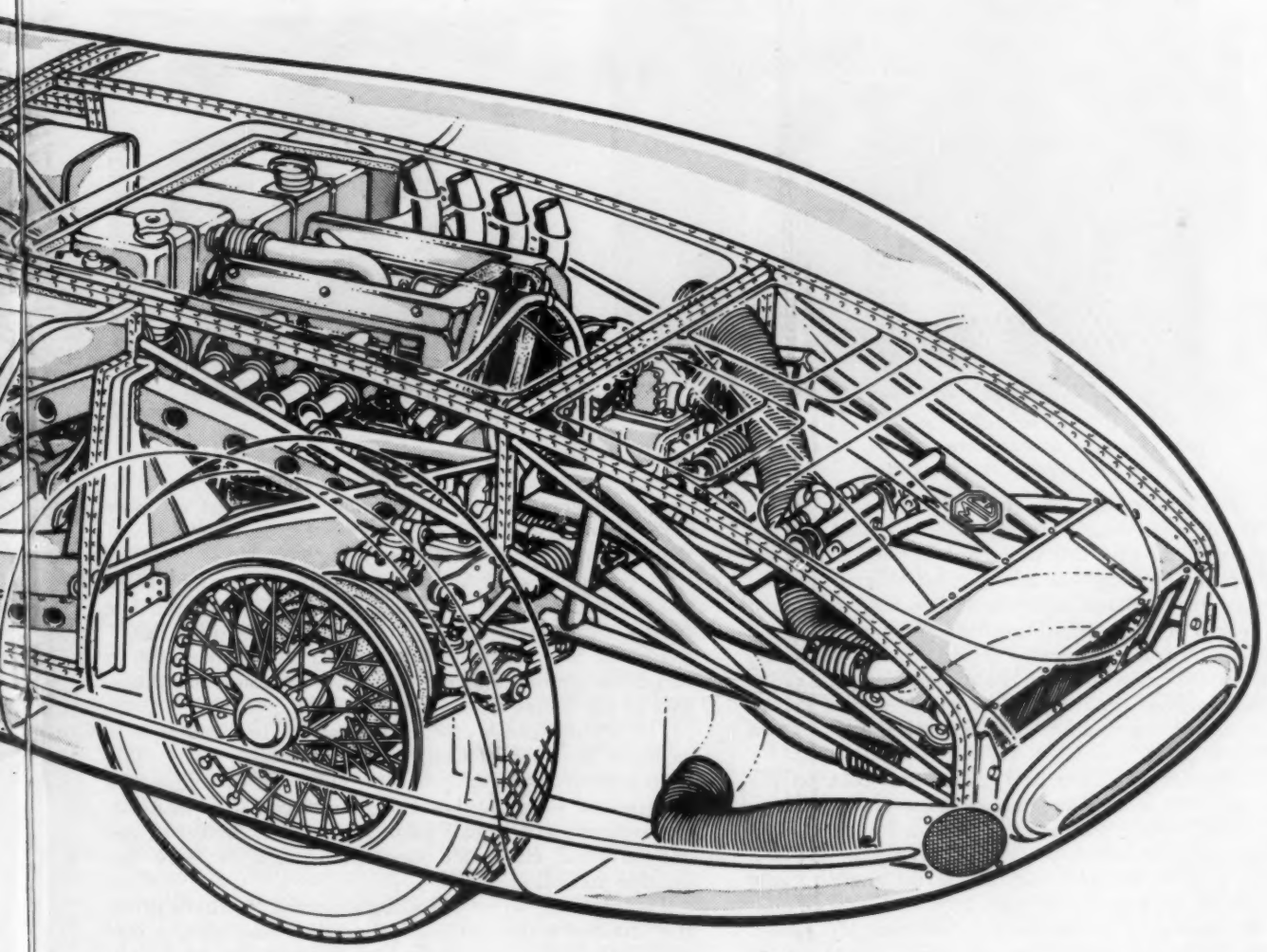
AMERICAN STANDING

Time	Distance	MPH
1 hr.	153.98	153.98
3 hr.	429.2614	143.09
6 hr.	853.6681	142.28
12 hr.	1700.5653	141.71

AMERICAN FLYING

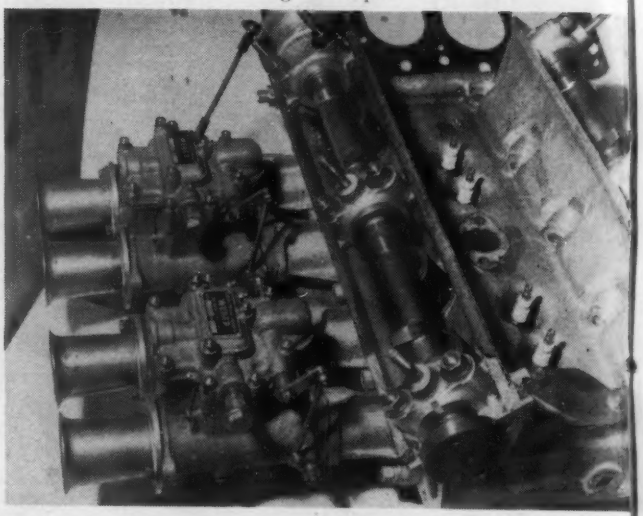
Time	Distance	MPH
1 hr.	155.38	155.38
3 hr.	425.9703	141.99
6 hr.	855.5774	142.60
12 hr.	1700.5653	141.81

**All records subject to confirmation by FIA and United States Auto Club. August 18, 1956: Ten-mile flying start International Class F — average two-way straight course driven by Johnny Lockett at 170.15 mph.*

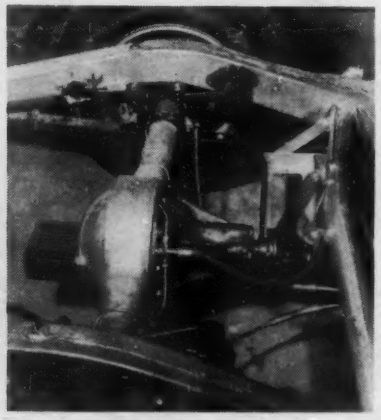


Cam drive is two-stage, by gear and chain. Large-capacity water pump has engine-speed belt drive, and special ignition angles to right.

Shroud-type cam followers are used in the MG record engine, which also carries 40 mm Webers. Throttle linkage is simple.



Construction of cam drive is still a tool-room job. Special water circulation system has tiny block holes, keeps cylinders warm and head cool.



Adjustable Andrex shocks are added to lever types. Axle oil radiator is competition must.

exhaust note of the new six-cylindered engine was noticeably different from that of the MG four that had run two days before. Even with this difference, at the start of the second lap an untrained ear could detect that all was not well in the six-cylindered department. Another lap brought no improvement in its health and the run was called off. After a considerable amount of feverish pit acitivity, the run was started again, but for the second time was called off. Difficulties with the fuel, or fuel system were described as the cause of the trouble and the run was postponed until Friday.

Wednesday saw the 1500 cc, Class F, MG back on the salt for an early start. This time nothing untoward happened and all Class F records up to 12 hours were taken at an impressive speed, with improvement over Sunday's record.

Four days later this car, with the sprint engine, established a new ten-mile flying start record of 170.15 mph under the piloting of Johnny Lockett. This year, MG earned everything they got and a lot of credit should go to Hounslow and his crew for the preparation and to the two drivers, Miles and Lockett, who apparently never made a mistake and were so proud of the car that you'd think they had built it.

The chassis and body of the MG are not new although the engine, which will be discussed later, is of new, experimental design. Incidentally, this engine received no more than a tappet check between the end of its six-hour run and the beginning of the second run of 12 hours.

Externally, this car bears more than a little resemblance to the record car used by Goldie Gardner and it is a further development of the EX 179 that set the 12-hour Class F records in 1954. At that time, it used a well souped 1500 cc rocker-box engine. This time there was a considerable difference in the engine type.

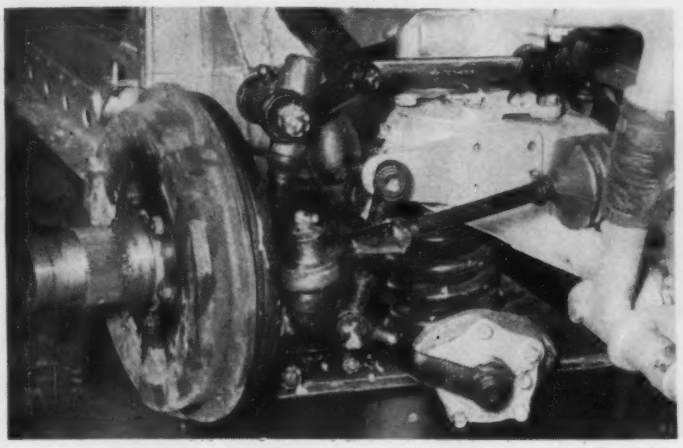
The chassis consists of two 14-gauge box-section side members that are actually prototype MGA units. The main firewall bulkhead is built in unit with the frame and triangulated with additional perforated box sections to insure rigidity and adequate frame stiffening. A tubular extension to these main side members is used to carry the radiator and oil cooler.

The rear axle layout is a straightforward Hotchkiss drive. It is attached to conventionally shackled semi-elliptic springs by U-bolts. These springs are heavily taped and four shock absorbers are fitted. Straps are also provided to snub rebound. A small oil cooler is fitted to the rear of the differential casing. It's interesting that this is located in such a manner that air currents from up-and-down movement of the rear axle are used instead of any direct flow from the outside. Straight-cut gears are used for ring and pinion

Standard MG suspension and brake components are used in EX 179, as below. Andrex shock is mounted as in old TD-Mark II, on lower arm.

Cockpit of Austin-Healey streamliner on lower right is fitted out for both safety and comfort. Manifold pressure gauge reads to 30 psi.

The Healey saltbuster, at right, is a fearsome sight as it poises for run. Shape is clean, but flat flanks may be sensitive to side winds.



instead of the more normal spiral or hypoid types. Although noisier, straight gears do simplify bearing and lubrication problems.

Front crossmembers similar to the TF MG carry standard suspension components of coil springs and "A" frames. Steering is by MG rack and pinion. In addition to the hydraulic shock absorber incorporated in the upper "A" frame, another of the friction type is used. Standard hydraulically-operated MG brakes are fitted to all four wheels. The body framework, which is made up of small round tubes and perforated square section tubes attaches to the chasssis at 14 points.

In order to avoid complications in removing the body, all the instruments are carried on an instrument panel attached to the main chassis frame. Attached to and removable with the body are the air ducts that carry air from small intakes in the front to the cockpit and the carburetors.

The body shell is made of 18 gauge half-hard aluminum and is fully streamlined. A plastic bubble covering the driver's side of the cockpit is incorporated with the head faring. This helps insure that wind resistance and drag are near the absolute minimum. The driver's position in the cockpit is on the right hand side. This is a change from the original EX 179 made necessary by the new engine installation. With the experimental engine the stubby exhaust pipes project from a hole in the left-hand side of the engine compartment and it was necessary to get the driver out of the exhaust stream. The left-hand side of the cockpit is completely taken up by the 34.5 gallon fuel tank. As would be expected with a distance record car, the driver's accommodations are comfortable. Not much space is wasted however—the steering wheel even being of a special shape to clear the driver's legs.

The bellypan that completely encloses the underside is made of 14 gauge half-hard aluminum and serves as a cockpit floor.

The four-cylindered engine, never mentioned without the addition of the word, "experimental", seems to be pretty rugged and reliable. The block and crankshaft are the production B type units; the bore and stroke being 73.025 mm x 89 mm (2.87 x 3.5 inches). The block is very short and rigid and the practice of extending the crankcase casting well below the center line of the crankshaft contributes a great deal towards bottom-half strength.

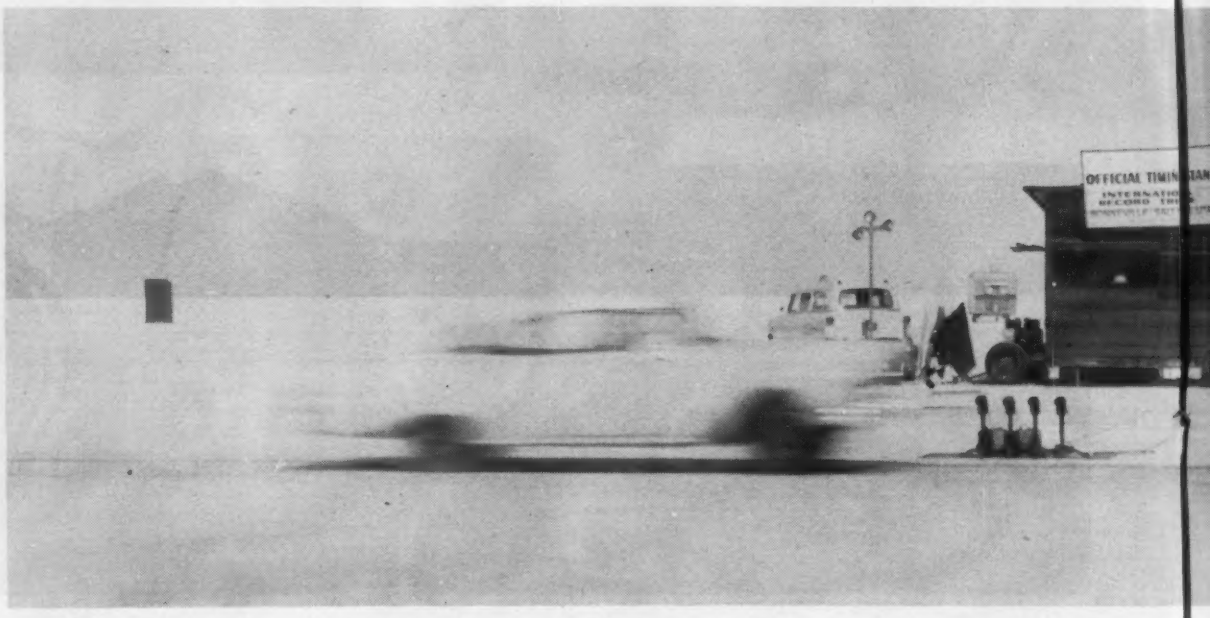
The three main bearing crankshaft is a steel forging with main bearings of two inches diameter and the crankpin journals, 1.875 inch. It has balance weights on each side of the center main bearing and one on the inner side

(Continued on page 62)

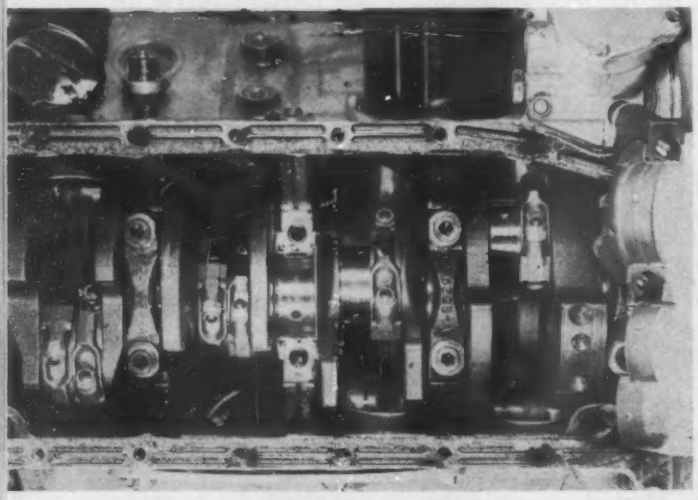
For twenty days Ford drivers roared flat out around the 12-mile circles at Bonneville. When they were through they had cracked 462 records and had gone . . . . . .

50,000 Miles

BY GRIFF BORGESON



Ford club sedan breaks beam in front of Official Timing stand on the ten-mile circle. Car blurred around track continuously for twenty days, averaging 107.15 mph for the period.



Underside of the engine after the 50,000 mile run. Center bearing cap, and pistons three and four of the left bank were removed for prelim inspection.

LAST SEPTEMBER, three '57 Fords literally wore out the four huge circles on the Bonneville Salt. For nearly three weeks the Fords flew flat-out in the longest, fastest endurance run in American history. Between the 7th and 29th of that month they created 462 new speed records, including 130.94 mph for 100 miles with the hot, wild-cam, 285 horse engine and 108.16 for 50,000 miles with the standard V-8 engine.

These are more than American stock car records—they include many, many records in FIA International Class B, Class A, Unlimited and World's record categories. The runs proved beyond any shadow of doubt that Ford markets a very potent and well-engineered car. They also proved what any student of racing knows: that there is no substitute for planning and preparation, for anticipating problems and whipping them before they occur.

Ford's campaign was a logistic *tour de force* as deadly serious an undertaking as any military offensive. For its "general" the company snaffled Danny Eames away from the Chrysler Corporation. Eames, who master-minded Dodge's massive record-breaking efforts in '53, '54 and '55, undoubtedly has more expert knowledge of the conduct of

The cars and the team that broke 462 salty records at Bonneville.

Fords on the salt to nowhere

Shredded rubber anyone? This tire ran over a broken marker stick splintered by another driver.

Piston after the 50,000 mile run at an average of 108.16 mph. Rings are clean and free, and skirt lacks varnish.

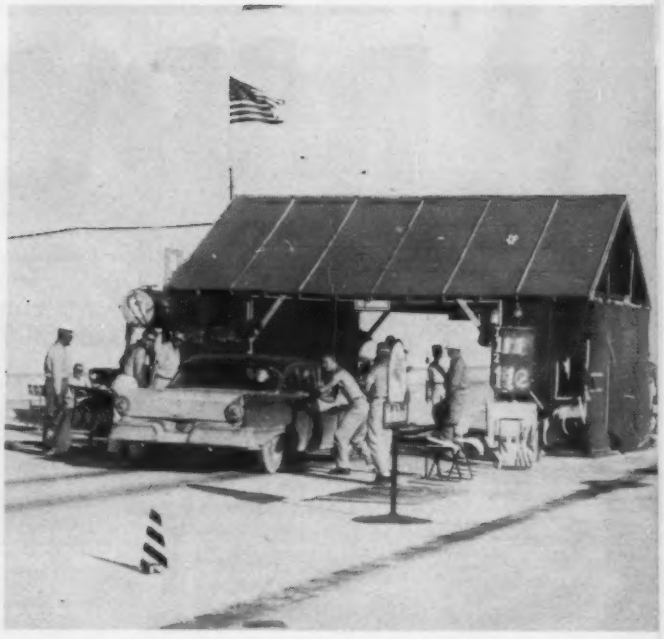
endurance runs on the salt than any man alive.

The cars used in the runs were strictly stock '57 models but they were tuned by past-master mechanics Chuck Daigh and Fran Hernandez—as exquisitely as the factory-entered Mexican Road Race Lincolns. The drivers signed on were men of almost legendary ability, including Chuck Stevenson, Johnny Mantz, Danny Oakes, Jerry Unser and George Lynch.

Even though preparations for the campaign began last spring, and in spite of the large number of people involved, the secrecy that cloaked the operation was air-tight. A week after the record-run crew had packed up and left the salt even FMC's usually all-knowing public relations department knew nothing of what had transpired at Bonneville. It was a secret—a secret weapon, actually, that was being forged, honed and held in the dark until D-day—the day that Chevrolet would innocently announce its own '57 models to the public.

The '57 Ford speed and endurance runs ground on around the clock and were carried out by two teams of drivers and mechanics working 12 hour shifts. Their

(Continued on page 46)



The main pit sees action. Record stop was 17 seconds; most stops took twenty.

The fight for low frontal area sometimes produces high parasite drag. No offense meant to W. B. Wagner, the owner of this straightforward Crosley-based "shingle".

BY JIM MOURNING
BOB ROLOFSON

The expression "small car, small cost" doesn't necessarily hold true in all cases but some of the most successful cost less than you think.

BABY BRUTES

YOUNG old-timers are prone to lean back, blow the foam from their buttermilk and regale road-racing neophytes with tales of the days when a man with a production MG stood an excellent chance of taking home the big hardware from any of the scattered events, and a Jaguar driver was virtually the Nuvolari of the back lots. But that era has long since become just a fondly remembered bit of history.

With the introduction of higher speed and equally higher priced machinery, there began a gradual drift toward the smaller classes. This movement was enthusiastically supported by a group of drivers including both the experienced and novice, who found they suffered from attacks of monetary dizziness at the ever increasing financial altitude or discovered that wheeling a sensitive, high-powered car could be a grim business and—for them, at least—not a particularly pleasant one.

At first, production Panhards and the like held the attention of this group. But, as time went on, the urge for more urge became overpowering and the Specials came into their own.

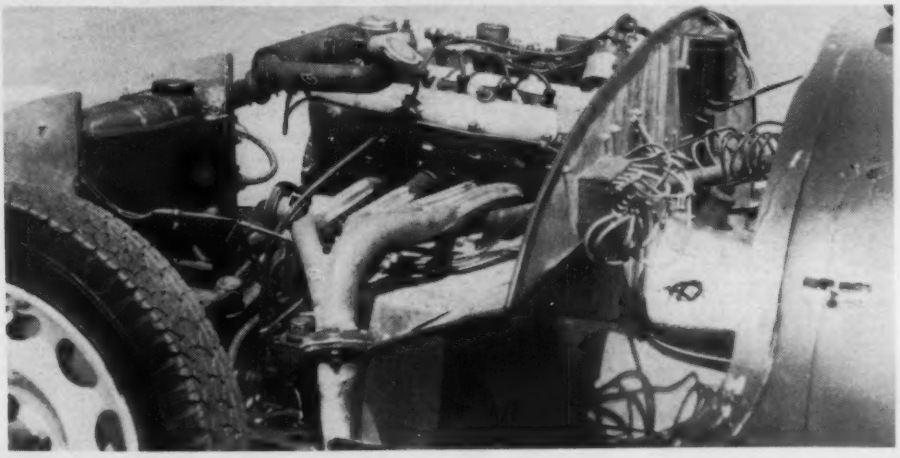
Interest in the smaller classes increased steadily—with the 750 cc power plants gaining added attractiveness when the Sports Car Club of America followed the FIA's lead in class realignment and dropped the 1250 cc MG into Class G. Now, no event, particularly on the West Coast, is complete without a large contingent of Class H competitors.

And so successful have the home-grown products been, that European factory-built sports racing products are seldom seen on U.S. circuits. When they are, they are likely to be handed a sound drubbing by one of the baby brutes that was lovingly put together in someone's garage while the family transportation sat exposed to the elements.

So here are some of the attempted solutions to successful Class H competition. Take a good look at them. You'll be seeing a lot more like them as time goes on.

A pioneer in tub-thumping for Class H, John Porter's old Panhard-powered Aardvark won by staying together, not ahead.

Here driven by Don Miller, the latest product of the Seifrieds neatly shrouds a Crosley.



Moretti engines have looked good on paper, but been too burdened down to go. The special shown at right and below removed the shackles.

Ray Howard drives John Biehl's very clean Moretti special in West Coast races. The roll bar is a must for '57 competition.

SCI

ROAD TEST: the DKW 3=6

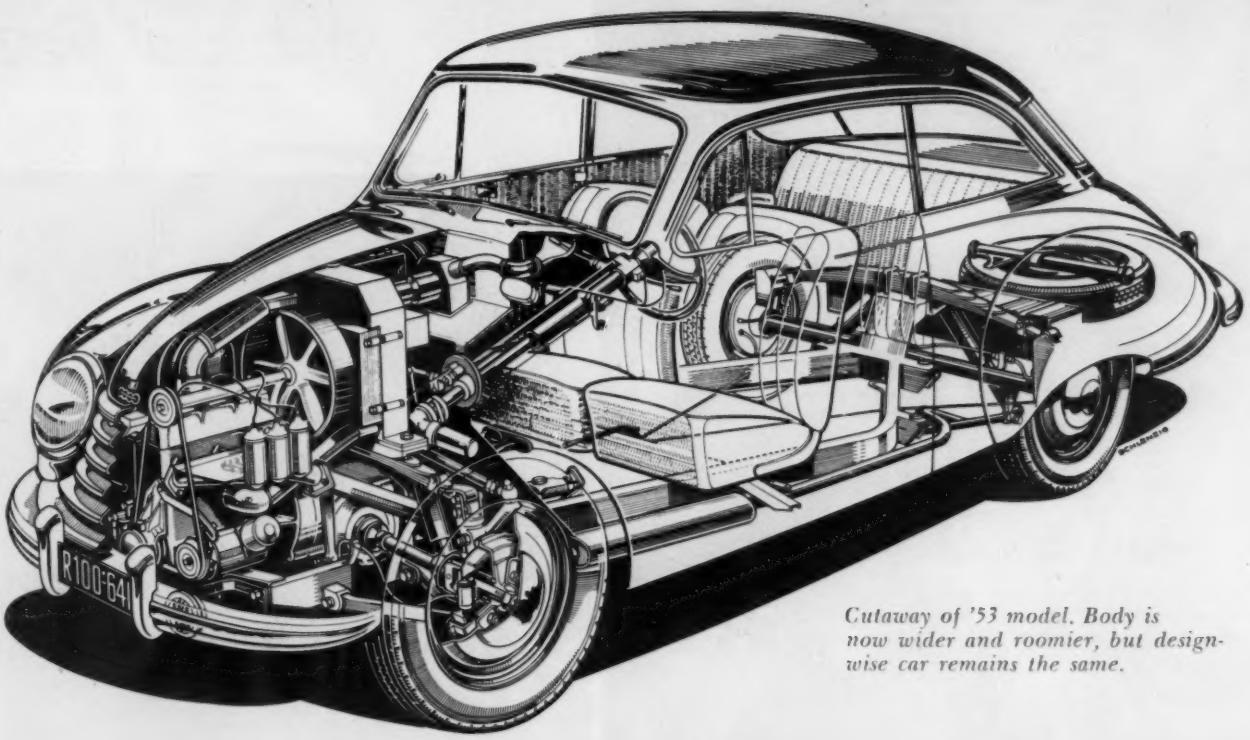
Large, wide spaced grille in the front section admits plenty of air to engine and radiator for optimum cooling. Underpan helps direct scooped air over engine and to back placed radiator.

THE DKW 3-6 is a car that drivers with a passion for the unorthodox will find fascinating if not irresistible. It is a three-cylinder two-stroke machine in a world of four-strokers; it has front-wheel drive and free-wheeling, and on a much milder level, it takes as much getting used to as its racing relative of the '30's, the screaming rear-engined Auto Union. The DKW is not everyone's dish of tea, but in the hands of a driver who digs it, it can turn out the kind of performance that brought it in third overall in the last Monte Carlo Rally.

Do not be deceived by the DKW's specifications. In spite of its meager-sounding displacement, it has spirited acceleration, plenty of reserve power for passing at legal highway speeds, and an honest top speed of more than 80 mph. A driver who has been well broken in on DKW's, who knows how to steer accurately with wheel and throttle, can give a demonstration of the car's "sporting" qualities that's startling and memorable.

Dragging full potential out of the DKW in corners takes experience, but the results are worth the time. The factory literature oversimplifies the situation by saying, "The power transmission system allows the car to be pulled instead of pushed. That is why your DKW car will always 'stick' to the road as long as you keep your foot on the accelerator pedal, no matter whether you are driving through sharp bends and corners or on slippery or icy surfaces. A slight touch on the accelerator and the car follows willingly the pulling power of the front wheel drive."

Actually, "stand on it and steer" isn't always the best advice for this machine. It *is* a very fast car in corners, and its adhesion is good to the point of being uncanny. But it is also quite heavy at the front end and this weight combined with the front wheel drive makes the rear end definitely slippery under certain conditions. When you



Cutaway of '53 model. Body is now wider and roomier, but design-wise car remains the same.

The 3-6's cornering in tight bends is noteworthy and commendable as long as the engine is pulling, but censurable when throttle is closed.

This view shows width and spaciousness of DKW's body.

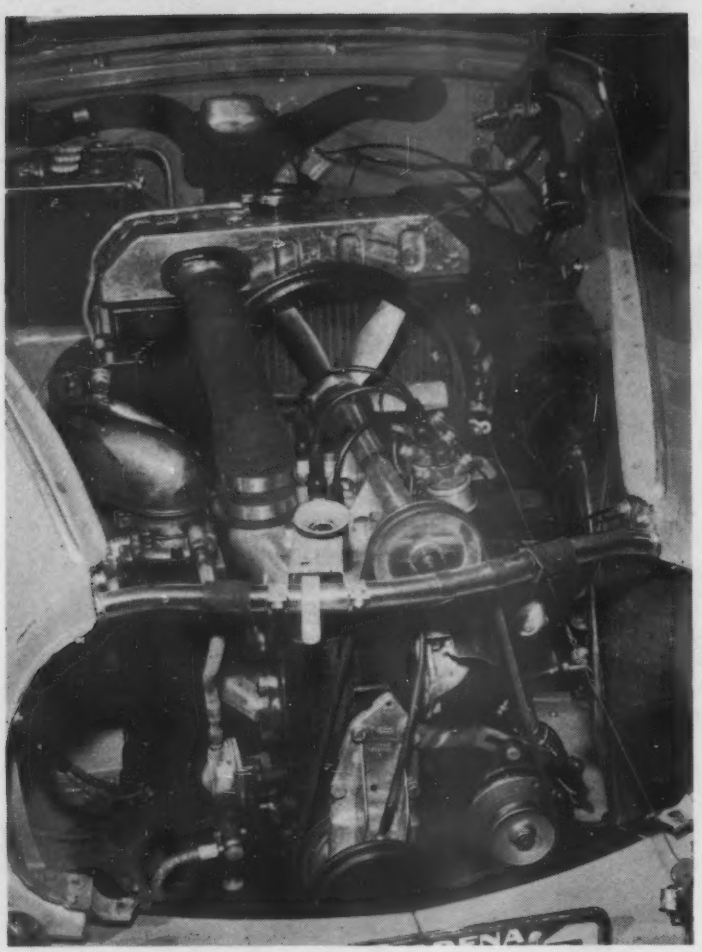
corner on dirt or gravel, for example, even at moderate speeds, you learn that the car has a tendency to rotate around its front wheels.

It's true, though, that the 3-6 corners best under power. It feels insecure if you take it through a turn fast with the throttle closed, but it's fine as long as the front wheels are pulling. However, when power is being applied to the wheels, they resist being turned and the muscle power you need to overcome the resistance increases in proportion to the power going to the wheels and the tightness of the bend. The DKW has to be *held into* turns up to the speed at which the rear tires begin to slide outward. This they do not suddenly, without warning, but gradually, in a way that makes for easy control. As with the Porsches, this trait can be exploited to give a high average speed over a course that has a lot of tight bends.

With just 2½ turns of the wheel over a large lock, the DKW is quicker steering than most. There is zero play in the rack-and-pinion gearing, but a slight amount of road shock is communicated to the steering wheel. The wheel itself has an unusual shape: its lower half is flattened into a half-oval to increase the space between wheel and front seat.

The suspension of the 3-6 is shown clearly in the cutaway drawing. At the front there is a massive upper transverse leaf spring with very substantial lower wishbones. A similar leaf spring limiting body roll, is used at the rear in combination with big, steeply inclined telescope shock absorbers and a pair of radius rods for fore-and-aft axle location and control of braking torque.

The performance of this suspension is very good. It does not iron out deep, washboard surfaces, a near-impossible job, but it absorbs and erases the jolts from really rotten roads very well, even at high speeds. Unlike many other



Layout of engine compartment of 3-6. The distributor is coupled to the crankshaft at the front. Fuel pump, lower left, works by diaphragm, pulsates with crankcase pressure.

Front suspension and drive. Transverse leaf spring is broad for car's size. Note sea-legged mounted shocks for extra turning stability.

cars, the DKW does not acquire an unpleasant light feel in the upper speed ranges. At 82 mph it's as stable and as solid on the road as at half the speed. Body roll in the turns and the car's sensitivity to cross winds are both minimal.

During one of the runs, incidentally, we got a clear indication of the efficiency of the DKW's smooth, wind-tunneled shape. For our first zero to 70 run we forgot to roll the front windows up. The turbulence in the passenger space was strong, and our time for the run was 39.4 seconds. With the windows up, though, our elapsed time from zero to 70 was 32.3 seconds — a fairly dramatic difference.

It's during acceleration runs, of course, that clutch and transmission are put to the toughest tests. The baulk-ring syncromesh on the DKW's top three gears proved to be absolutely infallible. In fact, not once during the many hundreds of miles we drove the DKW was there a trace of clash when shifting the sychronized gears. Slipping into First quietly was another matter. Furthermore, we found the shift pattern: R hard to get used to. Second and

2 4
1 3

Fourth are so close together that it's very easy to land in Fourth when you're planning to down-shift to Second.

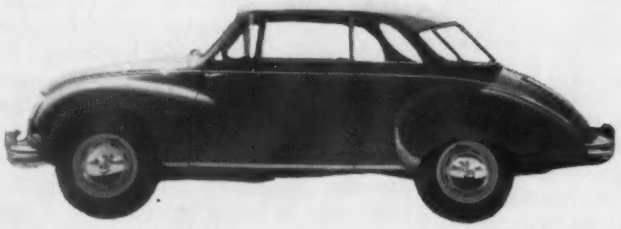
First gear is very low, and so is Second. The Third ratio, red-lined at 50 mph, is actually useful right out to an indicated 70 on this speedometer, which is, by the way, far more accurate than most. Third is a fine ratio for general traffic use and Second can be used for smooth getaways on level ground. We never needed Second for hill-climbing. The gearbox, criticized a couple of years ago for noisiness, is now perfectly quiet.

An integral part of the transmission is the free-wheeling unit, which you can engage or disengage at will under load by moving a lever below the instrument panel. We're accustomed to using the gears as much as the brakes for decelerating, and since engine-braking with a two-stroke engine is only a fraction of what it is with a four-stroke, we did no extended running in free wheeling. This feature was designed into the package for two reasons. One was to make possible a small improvement in fuel consumption; the other was to provide automatic declutching in closed-throttle positions, thus eliminating the drive-line snatch characteristic of two-stroke cars at low rpms.

When you're in free wheeling, shifting is practically effortless; the shift lever going from gear to gear like a hot knife through butter. Easy clutchless shifts can be made, but should NOT be; this puts too much load on the synchro mechanism. As with any free-wheeling setup, you get a pre-selector effect. You can downshift for a curve, for example, long before entering it, yet not engage the gear until you open the throttle.

Obviously, with its slowing power reduced by both the free-wheeling and the two stroke engine, the DKW needs good brakes. Fortunately it has them. Although the friction area per ton figure looks low on paper, it's plenty in practice. During our ten-stop fade test, the efficiency loss was a representative 12 percent, and very little pedal travel was lost.

Looking very clean in profile, the DKW retains individuality in style with American flavor.



Underside of car shows forward mounting of engine, and final drive and transmission housing. The half axles are U-jointed at both ends.

The most exotic organ of the 3-6, to Americans, anyway, is the two-stroke engine. It's practically an unknown quantity on this side of the Atlantic, but it's widely used overseas, and DKW, according to a spokesman for one of the company's competitors, was not only the pioneer in the field but also continues to be the main source of new ideas in two-stroke design. "We build a lot of two-stroke engines," the spokesman continued, 'but nearly all we know about them we learned from DKW."

DKW introduced its first two-stroke car in 1928, after methodically marching up an evolutionary ladder that started with two-stroke toy engines and went on to a clip-on two-stroke for bicycles; a two-stroke motorscooter, and finally a famous and widely imitated line of motorcycles. Since 1928 many hundreds of thousands of DKW automobiles have been sold all over the world, and in Europe today the name is practically synonymous with reliability.

The engine aspirates through ports in the cylinder walls; these ports are opened and closed by the passage of the pistons. Each cylinder has its own sealed-off portion of the crankcase. On the upstroke the piston uncovers the intake port and its pumping action pulls fuel-air mixture into its own crankcase compression chamber. While it's on the upstroke the piston is also compressing an already-admitted charge

At about top center the charge is fired and the piston makes its downstroke always a power stroke. Well down on this stroke the exhaust port is uncovered and exhaust gas escapes under pressure. Still farther down another port,

(Continued on page 55)

DKW PERFORMANCE

TOP SPEED:

Two-way average	82.2
Fastest one-way run	83.0

ACCELERATION:

From zero to	Seconds
30 mph	5.5
40 mph	10.1
50 mph	15.3
60 mph	21.3
70 mph	32.3
80 mph	53.2
Standing ¼ mile	22.4
Speed at end of quarter	Indicating 64 mph.
Standing mile	60.6

SPEED RANGES IN GEARS:

I	zero to indicated 20 mph.
II	6 to indicated 35 mph.
III	10 to indicated 70 mph.
IV	12 to top.

SPEEDOMETER CORRECTION:

Indicated	Actual
30	29
40	38
50	48
60	57
70	67
80	77

FUEL CONSUMPTION:

Hard driving	23.4 mpg during speed runs.
Average driving (under 60 mph)	31.2 mpg

BRAKING EFFICIENCY: With Perfometer

(10 successive emergency stops from 60 mph, just short of locking wheels)

1st stop	65
2nd stop	55
3rd stop	62
4th stop	56
5th stop	56
6th stop	55
7th stop	58
8th stop	55
9th stop	52

SPECIFICATIONS

POWER UNIT:

Type	In-line three, two-stroke, water cooled.
Valve arrangement	Cylinder wall porting.
Bore & Stroke (Engl. & Met.)	2.80 x 2.99 ins.; 71 x 76 mm.
Bore/Stroke Ratio	1.07/1
Displacement (Engl. & Met.)	54.7 cu. ins.; 896 cc.
Compression Ratio	6.5/1
Carburetion by	Solex downdraft.
Max. bhp @ rpm	42 at 4250
Max. Torque @ rpm	54.2 at 2800

DRIVE TRAIN:

Transmission ratios I	3.82
II	2.22
III	1.31
IV	0.915
Final drive ratio (test car)	4.72
Axle torque taken by	F: Engine mounts, R: Radius rods.

CHASSIS:

Wheelbase	92 ins.
Front Tread	50 ins.
Rear Tread	53 ins.
Suspension, front	IFS by transverse leaf, wishbones, double-U-jointed axles.
Suspension, rear	Solid tubular axle, transverse leaf and radius rods.
Shock absorbers	Telescopic two-stage.
Steering type	Rack and pinion.
Steering wheel turns L to L	2.5
Turning diameter	36 ft.
Brake type	Two leading-shoe front; leading and trailing rear.
Brake lining area	104 sq. ins.
Tire size	5.60 x 15

GENERAL:

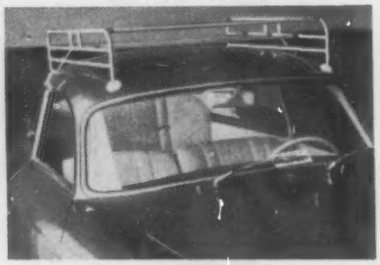
Length	166 ins.
Width	66 ins.
Height	57.5 ins.
Weight, test car	1980 lbs.
Weight distribution, F/R	55.6/44.4
Weight distribution, F/R, with driver	55.3/44.7
Fuel capacity	12 gallons

RATING FACTORS:

Bhp per cu. in.	767
Bhp per sq. in. piston area	2.27
Torque (lb-ft) per cu. in.	.99
Pounds per bhp—test car	47.1
Piston speed @ 60 mph	1810 fpm
Piston speed @ max bhp	2118 fpm
Brake lining area per ton (test car)	105 sq. ins.

Schreiber IMPORTS

AUTO ACCESSORIES



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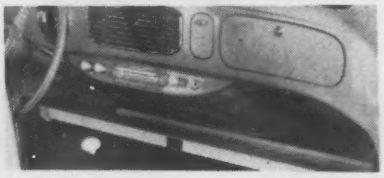

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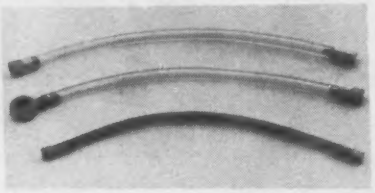

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'57 Fords—

(Continued from page 39)

first goal on the salt was to destroy Pontiac's claim to an assortment of dubious "endurance records" run just a few weeks before. This they did with ease—also clobbering the recognized Dodge records up to that point. The next big step was to improve upon the 31,224-mile Dodge 14-day record.

They did it handsomely by covering 36,755 miles in the exact two week interval. Then, just to give the competition something tough to shoot at, Ford kept the endurance run going for 20 days, covering 51,430 miles at an average of 107.15 mph. These records were set by two closed cars running simultaneously on great black-line circles on the salt. The open-car records were almost equally impressive.

To comply with FIA regulations all repairs during the runs had to be made

Overflow pan and proper CO_2 fire extinguisher are refuel precautions.

by the driver, using only tools and spare parts that were carried in the car. For this reason each of the Fords packed a load of assorted hardware that weighed no less than 200 pounds. But the results were well worth the extra drag. At one point, for example, Oakes snapped a drive shaft in mid-flight, far out on the course. Without delay he sprang out of the car in the six a.m. 42° F cold, got on his tee-shirted back and installed a new drive shaft, which he just happened to have along. That's preparation.

There were some incidents involving "cockpit failure," some involving failure of mechanical parts. One of the cars broke a couple of cam followers. Its quick-thinking driver snatched out the appropriate pushrods and finished that particular record-run on six cylinders. On two occasions drivers spun out on the course at high speed, but got their cars under control with no damage done. One driver, fatigued by the interminable grind, got off the course and came into the main pit with pieces of marker stakes impaled in his grille. The driver following him ran over the stub of a broken stake at about 130 mph and blew a tire but kept his machine under control.

There was very little of the sort of trouble that you'd expect during 50,000 miles of flatout record speed. There were no battery failures, for example; that often treacherous component, the voltage regulator, was completely reliable. On one of the hard-top cars the spark plugs were not changed until 30,000 miles—about three times as long as they "should" have lasted. Engineers present were flabbergasted by this and by the fact that the well-worn Champions still were highly serviceable.

The cars *burned* no appreciable amount of oil but, at the speeds involved, large amounts of oil were thrown or sucked right out of the breathers, drenching the undersides of the cars. The only difficulty remotely resembling a "bug" was the consistent failure of rear axle oil seals. It was thought that constant cornering in one direction might be causing this by throwing oil against the outside seal.

Running in the opposite direction was tried but this did not help. A likely explanation is that because the cars were always cornering, their differential gears were in constant operation. This would generate heat which, in turn, would generate pressure in the unvented axle housings that could force the seals.

This bug is not likely to occur in the course of normal motoring. But ring and pinion gear problems that have been all too common on recent Fords were totally absent on these '57's in spite of the punishment they took. In fact, these latest Ford record-runs were a demonstration of reliability that any manufacturer in the world would be happy to claim. By way of illustration, when the engine of the 20-day, 51,430-mile record holder was torn down there was no significant bearing wear, just a shade over one thousandth of an inch of cylinder bore wear, and the machining marks on piston rings and skirts still were clear.

Races and records are won on pit stops as well as on the course and pit management during the Ford runs was equal to the best *grand prix* practice. The 12-hour pit crews were in competition to score the quickest pit stop. This turned out to be 17 seconds in duration; during this time 17 gallons of fuel were taken aboard, a quart of oil added to the crankcase,

and drivers changed. A great deal of thought and teamwork went into these pit stops.

Mobilgas provided the fuel and lubricants and had a 55 gallon drum of gasoline kept under five pounds of pressure by compressed nitrogen; a safety valve on the drum popped at seven psi. A 50-foot hose, 1½ inches in diameter, was used for filling and drivers learned that if they would roll into the main pit at about seven mph the crew would have the car half fuelled before it came to a full stop.

Accurate fuel consumption records could not be kept because a good gallon of gas was dumped on the salt during each frenzied filling operation. On the 100-mile record run, however, fuel consumption was about seven mpg.

There were no female drivers this year and this had a morale-building effect in eliminating inevitable friction based on who did and who did not enjoy the ladies' favor. Ford imported a splendid cook who played an important part in keeping spirits high in a remote spot where comforts are few. Ford also made it a point to hire local

Change of tires all around and front end service were rapidly accomplished.

people as observers and aides. This built a strong sense of cameraderie between the locals and the visitors and gave the visitors the benefit of the matchless Salt Desert experience of old timers.

The Ford record-runs were a study in doing things the right, professional way. The frosting on the cake was the handling of the event by USAC, under the direction of Art Pillsbury. In the presence of a special FIA representative, Pillsbury and his crew of case-hardened Bonneville veterans demonstrated that they are the masters of scientific supervision and timing of events of this type. After the runs they did a typically scrupulous job of checking the disassembled record machines to verify their compliance with stock specifications. Needless to say, the fast Fords passed this test too.

Griff Borgeson

Rover—

(Continued from page 31)

ground at Lindley have shown the car capable of lapping at well over 100 mph with plenty of power in hand. The acceleration figures too, zero-60 mph in 10½ seconds, and zero-80 mph in 18 seconds, indicate that the car is not just a high speed freak.

No chassis details (other than the fact that the T3 has a De Dion type rear axle) have yet been released, but it can be assumed fairly safely that coil spring and wishbone front layout similar to the piston-engined production models is employed. Spare wheel and fuel tank are nose-mounted, and these, coupled with the weight of the front-drive differential unit, should help to balance the rather rearward installation of the admittedly lightweight power-unit.

Rover's statement that there are several problems yet to be solved and that a thorough test program must yet be carried through cannot blind anyone to the fact that there is nearly seven years' development work behind the T3, and that the exciting "jet era," at any rate for high performance, is just around the corner.

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T-Bird —

(Continued from page 25)

tachometer are welcome, but the latter is hidden away on the lower left and could easily be relocated upwards.

Another clever trick for an open car is incorporated in the radio control. Its volume is sensitive to car speed—allowing a louder setting for wind noise which diminishes in the quiet of city traffic. (No annoying blasting at traffic lights.) The right-hand side of the dash is basically unchanged, retaining its good-sized glove compartment.

The driving position is generally good, and the big dished steering wheel is nicely angled. There's just enough leg room and plenty of width, but with both standard and power-brakes there's a big level difference between accelerator and brake which can cause some discomfort. Although the rear view mirror forms a forward blind spot, vision all around is adequate.

Thunderbird development engineers are primarily interested in improving the ride of their "light" car, and to this end they were glad to move the pendulum weight of the spare tire back inboard. This has reduced pitching, and small bumps are well damped out. With the improvement in seating, the Bird's space and comfort factors rate very high.

Organization-wise the Thunderbird is now an independent Ford product and the car's structure now differs greatly from the wide, sketchy frame adopted for the low 1957 line. The heavily bolstered crossmember chassis is retained as is the coil front suspension. After a digression to four leaves in 1956, the rear springs are back to five leaves again. Shocks are basically the same but incorporate new valving.

A big change, and one which we were curious about, is the adoption of 14 inch tires and safety-rim wheels. Unfortunately, these were carrying only standard pressure as we wheeled the Bird over the serpentine Ford handling course. The factory engineer was remarking on the superior handling of the '57 car—we could just hear him above the anguished howling from the tires.

To be fair, the T-Bird didn't stick too badly, and the previously skittish rear end didn't act up at all. Understeer was there in big quantities; the wheel having to be wound well over to hold the car on line. Front/rear stability is somewhat better than before, but at the recommended pressures the overall traction is not outstanding and the car is somewhat of a handful. Power steering was welcome for all that twirling, and the Ford system is a good compromise between road feel and minimum effort. There are still well over four turns to be made, though, and once the car is lost the only way out is an ejection seat.

We didn't pound the brakes too hard, but did notice that the power boost would be a worthwhile accessory. Pedal pressure was definitely high for the resulting stopping power. Brake drum diameters for '57 remained at 11 inches, but a lining area increase is claimed as a result of widening the front secondary shoes. This seems to have stabilized the action of the self-energizing mechanism; a valuable step in reducing fade.

Basic engine options start with a 292 cubic inch V-8 for the standard shift version. This carries a 9.1 to one compression ratio and babbit mains and with a two-barrel carburetor delivers 212 hp at 4500 rpm. If overdrive or Fordomatic is ordered, 312 cubic inches are supplied. This puts out 245 horses at 4500 rpm on a 9.7 to one compression ratio, and copper-lead bearings are used. Holley produced a new low silhouette four-barrel carb for these cars which is exceedingly open and compact and challenges the fuel-injection boys for lowness. Its housing is the very thin replaceable-paper-element air filter; one wingnut takes this all apart.

New transom treatment has expanded Bird trunk, but spare intrudes.

Our engineering hack had the standard Fordomatic combination, with the now-familiar floor control quadrant. Properly used, of course, this can hold the gearbox in each of its three forward speeds as long as desired. To review briefly, low is held by leaving the lever in "L" position. The shift to second is made by moving the lever to "D", and that gear can be held by returning again to "L". Finally, high is reached by going up to "D" again. Our Fordomatic linkage was set to upshift at roughly 4000 rpm which corresponded to 30 mph in low and 57 in second.

Sports Cars Illustrated's test procedure is to click the watch as the throttle is punched, which accurately reproduces real operating conditions. This properly penalizes the sloppy automatics, and in this case, the time from zero to 30 was a mediocre 4.9 seconds. Using more extreme methods, our 1956 test produced a figure of 3.3 seconds which the newer car, being all of five pounds lighter, should be able to duplicate.

Allowing the box to shift for itself we moved on up to 50 in 9.3 seconds and to 60 in 12.7. With real clutches the Ford test drivers are running much closer to 10 seconds to 60, and deducting 1.6 seconds for the Fordomatic's bashfulness our time reduces to 11.1 seconds. This is a logical improvement over last year's 11.5 figure.

With preview and test traffic glutting the proving grounds, higher speeds weren't possible, but the engineers estimate a reasonable 116 miles per hour top speed for the Bird. Throughout it all, the V-8 spun with a competent whir and dug in nicely when it picked up revs. A modified manifold and bigger intake valves contribute to this, as does a new camshaft, but idling remains dead smooth at 600 rpm. The exhaust note is clean and not too blatty.

At the last minute Ford has announced two "Corvette Chaser" engine options. The "special high performance" and the "special extra-high performance" put out 270 and 285 hp, respectively. Compression ratios are 9.7 to one and two four-barrels are clamped on. No fuel injection is hinted at, but it's significant that Holley has acquired all U. S. rights to the long-developed English Lucas system. This has powered the factory D-type Jaguars to some impressive performances lately, and is simple enough to be suitable for Detroit. The engineers admit that they've been working on it, but fuel economy is still a problem.

Final refinements for 1957 include gas tank capacity up three gallons from last year's seventeen, and a completely new rear axle with straddle-mounted pinion. Ford has kept an open ear to customer wants in this very specialized line and its product should now be well in tune with demand. Sales so far seem to be a function of production, anyway, the target for this year being 20,000 units and over. As a comfortable, rakish, exclusive road machine, the T-Bird is a nice package, and it's farther from Sebring than ever.

—Karl Ludvigsen

V-4—

(Continued from page 29)

outlet to the oil cooler. Also in this area are the dipstick and the oil filler cap and breather.

The big oil cooler lies flat in the valley between head and cylinder. Air from the belt-driven nine-inch blower at the engine front is fed into a plenum chamber at the top of the valley. It is simple, with this layout, to duct cooling air directly to the heads, while the air to the cylinders has to go through the central oil cooler first.

This rig ensures that the heads and the oil cooler get the very coolest air, while the cylinders run somewhat warmer to minimize piston drag. Warm air is easily exhausted at both sides of the engine.

For all-around automotive use, AMC would probably fit a thermostatic shutter to the blower inlet. At present, it's sufficient to bypass the oil around the cooler (by thermostat) until the operating temperature is reached. The cooler and accessories are so mounted that no external piping is needed for the primary part of the system which pressure-feeds all the crank journals and the three babitt camshaft bearings. Two tubes are needed at the back, though, to pressurize the single rocker shaft in each head.

Yes, it's a simple rocker-box layout, with a few new touches. The cast iron rockers have cyanided tips and a pushrod/valve motion ratio of roughly 1/1.5. They are drilled from their shaft hole to the concave pushrod socket, and thus carry oil to the compact hydraulic valve lifters. Though such oil in the pushrods apparently adds to the mass of the valve gear, it seems likely that it more or less stands still while the rods move up and down around it—and, in fact, it helps a lot to damp out pushrod vibrations. Installation of solid lifters and adjustable rockers would still help to push the valve bounce barrier beyond a modified operating rev range.

Valves for each bank are placed in line and inclined toward the engine center to conform with the wedge shape of the combustion chamber. Both intake and exhaust valves are made of austenitic steel, and seat on very meaty Eatonite inserts. For fitting, these are cold shrunk while the head is heated. Present port diameters at the inserts are 1.31 inch for the intake and 1.06 for exhaust. There's plenty of space here for gouging out.

The pressed-in cast iron valve guides are flanged at the top to form working surfaces for the single valve springs. Lots of room here too for stiffening up.

Wedge-shaped in cross-section, the combustion chamber has a modified heart contour in plain view. The point of the heart is at the thick end of the wedge, and a rounded pocket at that spot faces the spark plug toward the swirl of the incoming charge. It's a good shape, for medium speeds, at any rate, and is now operating at a compression ratio of 7.5 to one. Die casting will eliminate any need to polish the stock chamber surface.

The intake ports are siamesed vertically at the center of the head, and a cast passage moves inward from their junction to a simple Y manifold at the engine center. To make die casting possible, an access hole roughly two inches in diameter is cast above the junction in the top surface of the head. It would be a cinch to pipe in a single carburetor here for each bank, and there may even be enough room to de-siamese each head. Porting below the normally sealed hole is big and clean, while the duct leading inward is a long and narrow rectangle, clearly intended to impart some heat to the incoming charge. This comes from a single Carter Type AS carburetor.

As yet unconnected by any standard manifold, the rectangular exhaust ports emerge from the ends of the heads.

(Continued on page 50)

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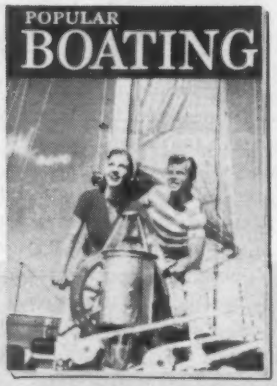

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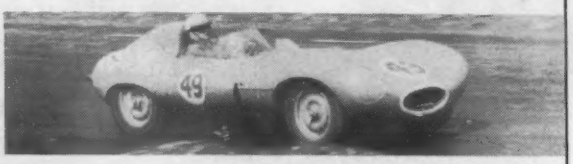

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V-4—

(Continued from page 50)

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Ignition for the military version is all heavy-duty and specially shielded. Coil and distributor are combined by Auto-Lite into one unit called an "ignitor", which is vertically driven from the back end of the camshaft. Spark plug size is 14 mm., and the cylinder head threads are armored by Heli-coil inserts.

The back end of the crankcase is fitted with a circular steel plate, to which clutch housings are bolted. At present, a cast-iron flywheel, roughly 13 inches in diameter, is carried. The package size of the entire engine unit is an approximate two foot cube. Weight, exclusive of generator and starter, is about 200 pounds. This shapes up as a very attractive and versatile power package which, with its modest 62 horses, would be almost ideal for an "American VW". It's valid to infer, from its rugged lightness, that is would be an equally good basis for an "American Porsche".

Obviously, as in the VW, the power is deliberately restricted by the very modest provisions for breathing, and the peak output is obtained at 3500 rpm. The torque comes in between 1600 and 1800, and has a notably flat curve contour. It's not held to these figures by bottom-end or valve gear deficiencies, though, 4400 rpm being regularly reached on the dyno. A pilot installation in a Metropolitan operates within a 5000 rpm limit, and a few modifications from standard, as outlined, should result in a very "revable" unit.

Frankly, though, as we write the production picture is far from clear. We think that the Marines should jump for this and hope that they do, since that's about the only way it'll see quantity output in the very near future. Industrial and automotive uses would back up such an order, and American Motors representatives have indicated an eagerness to cooperate with the sports car movement when the time comes.

If you already have the urge to cast up a new head for this bomb (you need only one pattern), or to start lopping off those cylinders, we suggest that you drop a line to the Special Products Division, American Motors Corporation in Detroit, and let them know how much it would mean to us to have a raft of these V-4's to do exciting things with. If development is arrested, we'll have missed the very best bet yet.

—Karl Ludvigsen

Sexy Six —

(Continued from page 23)

It took Mr. Lyons' four wheeled son of a sidecar some time to make good the boast implicit in the Swallow *Sports* appellation. First move in this direction was made in 1933, with the announcement of an open four-seater with new souping adjuncts to the ordinary L-head 2½ liter engine. Then in 1935, about a year after the recruitment of a young Humber engineer called W. M. Heynes, SS precedent was swept aside as they launched a car that was as fast as it looked. The SS90, as it was called, was a hairy sports two-seater with a purposeful, sawed-off look and a top speed that just about corresponded with the numerals after its name.

Heynes, later to become famous as the man mainly responsible for the design and devolopment of the XK engine had been assigned the task of giving the old L-head movement a fresh childhood, and at that, a more vigorous one than any of its previous infancies. In this, by dint of a still higher compression ratio, specially designed cams, ignition modifications, a special crank, etc., he succeeded. The resulting 90 engine, with an output of somewhere around 86 bhp became the heart of the first SS with a valid claim to the designation of sports car.

The Ninety's span was brief, however, for less than a year after its debut almost the whole range of SS automobiles was tossed into the melting pot, and there emerged new shapes, new conceptions of performance, and a new family name—"Jaguar"—that was destined for a history making role in every part of the motoring world.

Bound up with this event is a story that illustrates the sort of loyalty and service that William Lyons, then aged only 33, expected, and got from his key men. A month or two in advance of the 1935 Olympia show, at which the hush-hush ohv Jaguars were scheduled to make their bow, he called all department heads into conference and demonstrated by charts, statistics and a desk calendar that their pre-show timetable was impossible to achieve unless they were willing to forego personal liberty practically 100 percent.

This, he suggested, might be easier if they could make themselves imagine they had been convicted of heinous highway offenses and jailed. They tried his self-hypnosis prescription and it worked.

Up to and including the show—into

(Continued on page 52)

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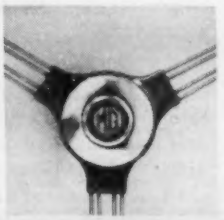

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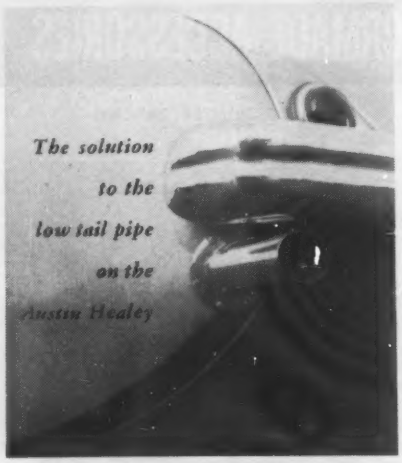

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Sexy Six—

(Continued from page 51)

which the just completed Jaguars scraped by the skin of their fangs—they stood up their girl friends, risked marital feuds by routine absenteeism from home and hearth, gave the go-by to every kind of evening and weekend recreation—from movies to beekeeping.

After Olympia shut they called a conference on their own account and asked Lyons to sign an order for their release. He was sorry, he said, but he couldn't. Thanks to their efforts, the new cars had created a demand that would strain production resources to a breaking point. From now on he doubted whether anyone of consequence around the plant would even get time to sleep.

The stir the early SS Jaguars made surpassed the Sexy Six furor of four years back. Lyon's company, reorganized as SS Cars Limited, now enjoyed full manufacturing status rather than just being an assembly shop that housed somebody else's chassis in its own fancy body. Its steadily waxing prosperity since 1931, moreover, had silenced the wishful prophets who said you couldn't build up a stable and permanent car business around a motorized boudoir.

Lastly, but most important of all in terms of widened sales appeal, the Jaguar was every inch a real car, sound mechanically from bumper to bumper and with a sobered up styling for the breadwinning sedan models which looked like a very passable imitation of certain custom-built Bentleys.

First of the ohv engines was a six measuring 73 by 106 millimeters, known loosely as a 2½ liter, but in fact, displacing 2663.7 cc. As in the old L-head Standard unit, the accent was on bottom-end rigidity, and the beefy crank was supported on seven main bearings. The valves were vertical and all ports separate—twin S.U. carburetors feeding initially into a gallery cast in the cylinder head.

Harry Weslake, the well-known authority on combustion and porting problems, who was later to play an important part in XK affairs, was called into consultation in these departments. In the "little touch of Harry" there evidentally dwelt some of the genius of Weslake's Shakesperian namesake, because the engine developed the satisfactory output of 102 horsepower. Although not outstanding for flexibility, it did its work with a likeable smoothness so long as the revs were kept up.

Manufacture of this mill complete with the highly desirable four-speed synchromesh gearbox that was married to it, was farmed out to Standard. For the rest, the SS people themselves produced all Jaguar components that came within the normal scope of a non-specialist plant.

William Lyons had always had a flair, amounting to brilliance, for economical engineering production; and as usual it enabled him to undersell his rivals when the first Jaguars broke loose. At a big roundup of dealers and motoring writers, staged at a swank London hotel on the eve of the announcement of prices for the new cars, he had paper blanks distributed around the tables and invited his guests to write down their realistic estimates of a selling price for the 2½ sedan he had just unveiled. Average of the figures turned in was $200 above the mark already decided on—an overshoot of around 17 percent.

With just one exception the overhead valve SS's were totally new cars. The exception was the two-seater sports job, which progressed from SS90 to SS100 rating with practically no change that you could see without lifting the louver-slashed hood. The same held good when, in the fall of 1937, a 3½ liter engine was offered as an option to the 2½ in the 100 model. Generating 125 bhp and harnessed in a stumpy little chassis with a wheelbase of only 104 inches, this mill marked the end of the pendulum's swing from the days of the elongated and underpowered Sexy Six.

Neither of the 100's—2½ or 3½ version, was a phenomenally fast car (not in stock form, anyway), which isn't surprising when you consider its peculiar length/width ratio and the fury of the aerial disturbance that its

assortment of angles, pockets and projections must have set up at anywhere over 80 miles an hour.

In this respect, of course, it was neither worse nor better than other typical sports cars of the Thirties. With a power/weight ratio of better than 125 horsepower per ton, on the other hand, the 3½ variant was certainly no loafer from a standing start up through the closely spaced gears; and this, combined with a high degree of manoeuverability in tight turns (the natural outcome of a short wheelbase and good steering lock), made it a formidable opponent in rally tests.

Moreover, it opened up new fields of self-expression for young men who had always known they were Malcolm Campbells in everything but income. Before the coming of the larger engined 100, cars capable of a genuine 100 plus mph in highway trim had been the preserve of a tiny coterie born to Bentley, Lagonda and Frazer-Nash standards of wealth. Now, three-figure motoring became available at somewhere around half of Frazer-Nash prices.

On racing, meanwhile, William Lyons had made his company's position clear: they weren't touching it. If private owners wanted to race at their own expense, good luck to them, but any form of official support was out. Once, this policy had a droll repercussion. An SS100 privateer, one F. J. McEvoy, entered himself for the Marne Grand Prix, which was a sports car affair that year. The SS advertising department, it is to be presumed, had never heard of either McEvoy or the Marne G.P.; so when a cable brought tidings that Mac had won his class in the Marne Grand Prix, they promptly transcribed it into an ad, not forgetting to dot that interloping "i". For weeks afterwards the company was receiving letters asking for details of SS speedboats.

The highest speed recorded by a 3½ SS100, except perhaps in short bursts and without independent verification, was 118 mph for a lap of the old Brooklands track. This was in the course of a race that the 100 in question won at an average of 111.85 mph over a distance of around ten miles. Distinctly faster than standard (a regular 3½ liter 100 would hit about 105 mph), the 118-lapper was running an ultra-high compression and using racing fuel.

In spite of the care taken in the design of the pushrod ohv engines to avoid local hot spots—water being directed specifically at the plug bosses and exhaust valve seats, one of their few vices was a self-igniting tendency after switching off. This was a fault also common to the corresponding four-cylinder (1½ liter) engine, likewise with pushrod ohv, that came simultaneously with the Heynes designed sixes. The fault was probably caused by using a higher compression ratio than pre-war gas warranted. The sedans and convertibles suffered — or rather, their owners did — from excessive under-hood temperature which transmitted itself back through the firewall and pedal board and kept fried soles permanently on the menu.

At all clips above eighty the 3½ liter 100 was quite enough of a handful to keep the average driver preoccupied. The frame, as well as being too short for the car's speed capability, was somewhat lacking in rigidity; also the vane type of spring dampers fitted were inadequate for their job. An experienced and adroit operator, on the other hand, was able to make proper allowance for such shortcomings, as was seen when an SS gave the best performance by any British car in the 1938 Alpine Trial and repeated this score the following year in the Monte Carlo Rally.

Who thought up the name Jaguar? I don't know, but the hunt that lead to its adoption was instigated by Lyons

(Continued on page 66)

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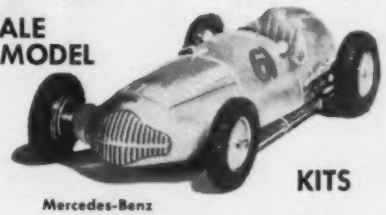

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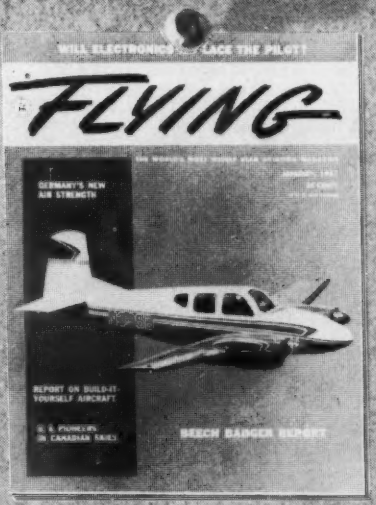

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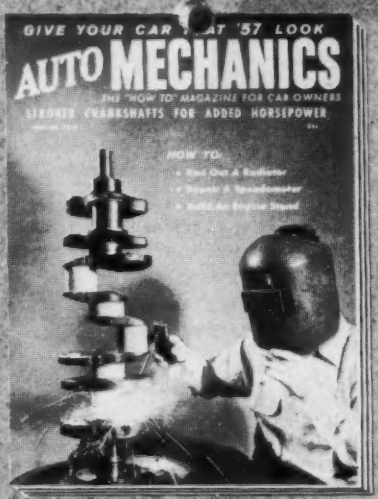

Strange things have been going on under the hoods of experimental automobiles recently. Here's your chance to learn about unusual "odd-ball" engines — developed to increase efficiency. Be sure to read about them in January AUTO MECHANICS.

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DKW –

(Continued from page 45)

called the transfer port, is uncovered and through it enter a fresh charge that has just been pressurized in the crankcase by the downward stroke of the piston. And so goes the two-stroke cycle.

The lower-end bearings and cylinder walls are lubricated by oil mixed with the fuel. The "petroil" mixture is created simply by pouring both the oil and the gas into the same hole in the proper proportions, a procedure which evokes an occasional raised eyebrow or pitying smile from service-station attendants. The engine is evidently fairly insensitive to variations in oil "weight" or viscosity—some of the factory literature recommends SAE 30, some SAE 40 or 50 – and this suggests that the owner needn't worry unduly about maintaining the precise proportions of oil and fuel.

At each revolution of the crankshaft the bearing surfaces get a fresh supply of clean oil. Cold starts, a major source of wear for four-stroke engines, are no problem with the two-stroke; the more you choke it the more lubrication its critical bearing surfaces receive. In spite of its apparent simplicity a lot of costly machine work goes into the well-made DKW engine.

Like some of the better Bugattis, the 3-6 uses a built-up crankshaft with disk-shaped webs between each throw, each disk acting as a small flywheel. This construction permits the use of one-piece con rods running on roller bearing big ends, plus ball-bearing mains.

At idle the two-stroke cycle is typically rough. Engine breathing is irregular, the engine rocks and the exhaust note putts arhythmically. This is the most immediately noticeable difference between the engine performance of a DKW and a comparable four-stroke car. But as soon as you open the throttle the engine smooths out to a degree that is rarely encountered in a four-stroke.

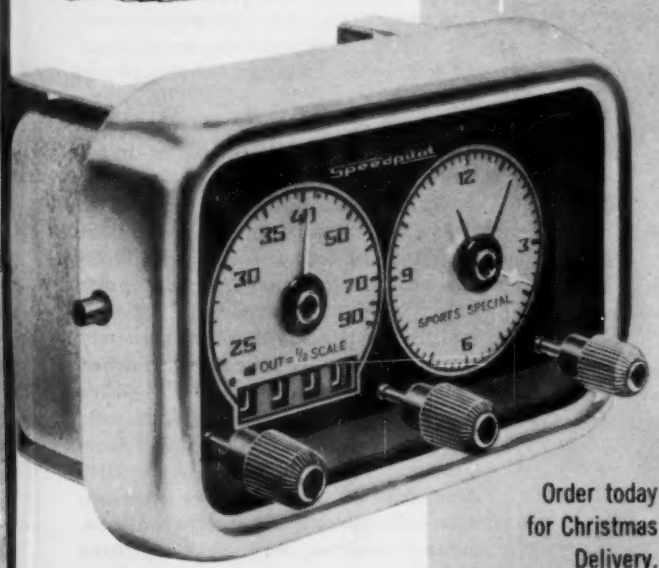
The engine is smooth as silk and the only sound you hear is a faint, pleasant, singing whirr. It revs with remarkable freedom and the whole car rolls along with a frictionless, ball-bearing feel; there are no signs that it's beginning to work until about 75 mph or so.

This suppleness and ease of functioning are particularly apparent in the higher gear ratios; the engine can be wound tighter in the lower ratios, and when it begins to approach the limits of its revs it vibrates hard. Another time you're acutely aware of vibration is when you're using the engine as a brake.

The throttle response of the 3-6 engine is excellent, its pulling power is very good for cars of its class, and we experienced no hint of spark plug fouling or any other trace of temperament about the engine. The exhaust is clean, and only rarely is there a little puff of blue vapor to remind you that petroil is in the fuel. In our experience petroil mileage reached a low of 23.4 mpg during the very hardest top-speed and acceleration runs and a high of 31.2 during light city driving. Some owners report 35 mpg on cross-country trips, using free wheeling.

In the frame of reference of the light-car class, the DKW is superior to many in finish, space and appointments. The coachwork is very good, and the quality of the total package is testified to by the unusual guarantee coverage: six months or 6000 miles. But these virtues notwithstanding, its our opinion that the biggest appeal of the 3-6 will be its sheer uniqueness. For the driver who wants a car that's different, both in engineering and handling qualities, this is it.

Griff Borgeson



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Porsche—

(Continued from page 19)

to cop the under 1500 Sports Car class at the National Drag Races in May and beat out a 2,500 cc Hudson Italia (how he got in my class is a mystery) for the trophy.

Platinum point spark plugs are a must. The great variation in operating temperatures from cylinder to cylinder as well as in town and country driving practically demands them. One tip: use the gaskets from Bosch plugs on Lodges. Get the right reach and range from the comparison chart. Do it yourself—there are many combinations and confusion is easy to come by. The rest of the ignition is wonderful. Let it alone. Just set the points for the gap called for by the spark plug manufacturer—it's on the wrapping paper.

Going Under The Skin

Carburetors are not interchangeable on the manifolds between engines, but manifolds are. Therefore, to put Super carbs (PBIC 40) on the less powerful model one must merely rout out the intake ports in the heads to the pattern furnished by a Super manifold gasket and bolt the works on. This is a natural path for the person who is used to dropping a couple of 97's and a dual set up on to a V8, but the sticker with the Porsche is the cam.

One really needs the duration of the Super cam to take advantage of the bigger jugs. If your purse is not feeling that well, try this: Get the 26 mm venturis from either the 32 or 40 carb and replace your tiny 24's. If the 40's are the only ones around (usually the case) it is necessary to turn down the outer diameter to 32 mm. No harm done. This, with the richer jets, will give you more carburetion for acceleration and top speed but will play hob with gas economy. Cost: $1.60 each plus machining.

Increasing the valve spring tension will help at the top end and the procedure is the following: Remove heads and check spring tension and compressed length. Factory advice is for 83 pounds and 1 15/64 inches on the outer springs, 34 pounds and 1 11/64 inches inner. Set this and then add *one* spacer. The spacers are .020 of an inch thick and are available from all Porsche parts houses.

Valves are as big as possible now and the ports are fairly clean. However, careful polishing will help a great deal. As an aside to those who may have worked on cast-iron blocks exclusively, this is skilled labor, because it's all aluminum and easy to ruin.

For something between the regular and Super cam, Ed Iskenderian grinds a moderate lobe for around $40 exchange. The Super retails for a rough $70 but it's vital to go the route for big jugs when you install this baby. A look at the valve timing chart will tell you why. The Continental actually out-performs the Super at low speeds up to about 3,000 rpm because of the cam characteristics, but from 3,500 on up the Super's dwell makes it no Contest.

Go Super

If these things don't keep you up with the Joneses you can go completely Super (either 1500 or 1600) in this fashion: Remove engine. Disassemble to crankcase, take .040 of an inch from bottom of barrels where they join the case, being extremely careful that the new surface is exactly parallel with the top of the cylinder. Take a like amount from the pistons at the relief on the crown and out of the valve recess. This will result in an increased compression ratio of about 8.1 to 1, depending on the combustion chamber volume. This volume is marked on the center of each head, incidentally, and if one head is spoiled, be sure that the new one matches the old.

Rout out the intake ports for Super manifolds, attach same with carbs, exchange for hot camshaft, refit engine, and you'll have a Super in everything but assembled crank. The latter is a doubtful blessing in many minds, anyway. One Super which races quite successfully has been de-tuned to the extent of installing the plain bearing crankshaft. Full price will be: approximately $300 minus whatever you can get for discarded parts—probably $75.

Bore Vs. Stroke

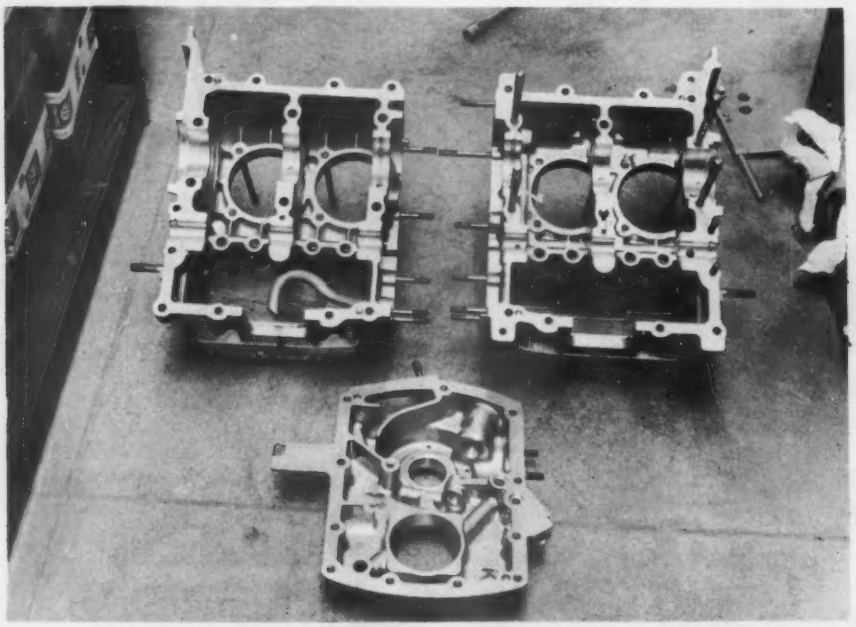
For some, greater displacement is a lure. Let it be said here and now that running a boring bar into these cylinders is not in the cards. There is plenty of metal, but there is no access to metallurgy. The composition of barrels and pistons is a closely guarded secret and they come only in pairs, so abandon the thought of running about a quarter of an inch bigger. However, the crank *can* be stroked.

It is necessary to have the job done by a competent crankshaft grinding service—one which has specialized in hot-rod or racing work for the welded metal method must be used—no metal spraying. The journals are welded, turned off-center to the new stroke (0.080 inches is o.k.) and the mains re-aligned by turning to the first size under. This is a millimeter size, slightly less than 0.010".

Stroking the 1500 gets about 94 cubic inches. (One brave group in Los Angeles stroked a VW crank 0.250 inches recently, had special pistons made and is out merrily pulling corks on other surprised VW's. Unfortunately, this one got away before we could find out about those pistons.)

If no more than 0.080 is added, only a slight amount must be routed from the case for rod clearance and the 0.040 knocked off the pistons as described above. Compression is automatically increased, too, so don't take anything from the barrels.

Stroking for approximately $90 is the most practical method for owners of the earlier two-piece crankcase types who want more volume. The added fraction of an inch increases torque noticeably.



Beautifully ribbed internally, crankcase splits in two halves with cover for front.

Going 1600

The later (three-piece) crankcase will accept the 1600 cc barrels without any machining whatsoever. It is a simple matter to remove the old units and place the new ones in position. The precaution to be doubly sure of is to align the barrels absolutely vertically. Mike the gaskets even to be certain that the barrel is not cocked on the case. Otherwise, it's a simple remove-re-fit job; the big sting is in the price: $250 for a new set, plus tear-down and replace charges. Better than three bills is involved. Silver lining in the cloud: selling the old parts. Used Porsche parts are at a premium and it's a cinch to get $100 for your 1500 cylinders in good shape.

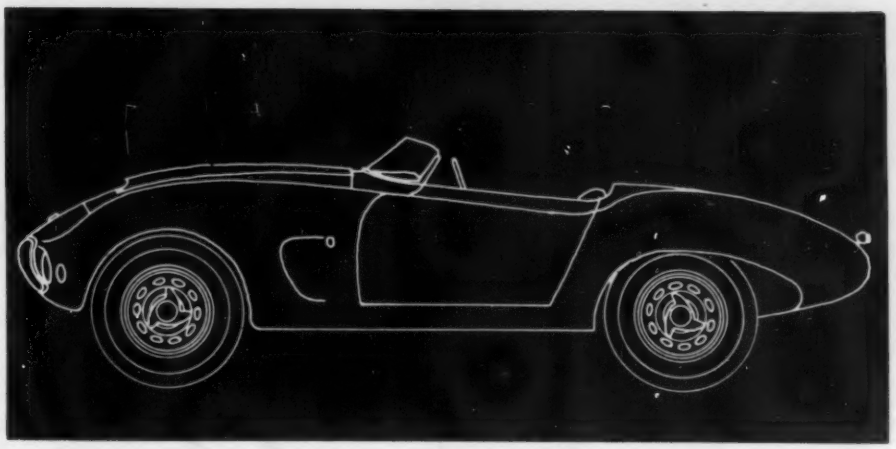
Of course, any combination of the above changes can be effected, and a real hot engine of 100 cubic inches can be developed (for an outlay of about $500) starting with a late model 1500 Continental. Such a hot-rodded go-toy will pull anything around except the 550 and would have no difficulties with bigger playthings such as the XK 120 Jag. Dynamometer tests indicate that the Porsche is getting the highest percentage of power to the ground of any car. With a few more horses under the back deck lid to call on, there's no doubt that it would be the most $3,500 car on the road.

With factory output of six to nine units per day, each Porsche is an individual with its own characteristics. Cam lobes vary by several thousandths, for instance, and as a parts supplier makes an improvement it is adopted regardless of model year. Ten cars of the same year when put on a dyno would register ten different power curves. My coupe has always run exceptionally well and I hated to tear it down for fear of spoiling a good combination—but the opportunity of going 1600 could not be resisted.

First, a Clayton chassis dyno test was run (under the scrutiny of Bill Lord of Lord's Automotive) and a graph taken representing road horsepower. From an advertised 55 hp, 52 gets to the ground at 4500 rpm in fourth gear with the 1500 normal engine.

After porting the heads, substituting 26 mm venturis and installing 1600 cylinders with 8.1 to 1 compression (but retaining the stock cam), a little over 66 hp was developed—an almost 30 percent gain. The car remains as smooth as a kitten in traffic and demonstrates none of the objectionable characteristics of the hopped-up engine.

Total cost: approximately $250. And, well spent in my opinion. I am quite satisfied. However, if I have to tear it down again for rings or some such, I might just as well have it stroked and put in that Super cam . . . —*OCee Ritch*



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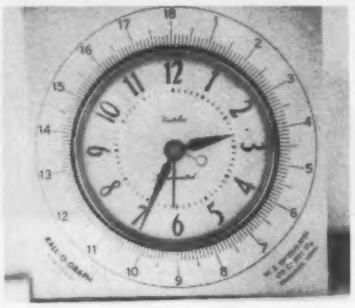

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See page 8

Keely's Wondrous Water Engine

EVER since the first horseless carriages puffed and snorted along rutted wagon roads, the development of the automobile has been inseparably linked with the search for cheaper and more effective means of powering it. In 1872, John Ernest Worrell Keely, a former carpenter from Philadelphia, announced the development of an engine utilizing ordinary water — and the millenium seemed at hand.

Cynical enthusiasts, of course, will immediately draw an obvious comparison with the recurrent water-to-fuel pill fraud. But Keely's solution was nothing that crude. He had, so he claimed, developed an engine based on an entirely new concept suggested by the oscillation of a tuning fork. What that concept was, he never fully explained. But over a period of time, he did manage to reveal that his engine created power without chemical compounds, electricity or galvanic action.

Did it really work? According to Keely, it did. Couching his reports in such terms as "latent basis of energy," "etheric force," "elastic energy" and "pulsating vacua principle," he told of having run an engine producing 40 horsepower at 800 rpm for two weeks on less than a teaspoon of regular tap water.

Whether his engine worked or not, his line certainly did. In 1874, a group of stockholders organized the Keely Motor Company in New York and settled back to wait for the profits to flow in. When the expected torrent failed to materialize as even a moist trickle, the stockholders, who certainly were businessmen if not engineers, began to complain.

Finally, in November, 1874, Keely agreed to give the first in a long series of miraculous demonstrations at his Philadelphia workshop. Performing with the skill and finesse of a stage magician, he dramatically poured a pint of water into his wonderous machine, waited as the gauge edged slowly up to 50,000 psi, then astounded the assembled stockholders with a display that included snapping steel bars and ripping heavy cables apart with obvious ease.

Throughout the next 24 years, he actively promoted the engine and stressed the commercial possibilities of it whenever backers began to grumble. A car could run virtually forever on one tank of water, he declared, and a single small unit could power a train from Philadelphia to New York at 60 mph on a quart of water. Automotive design would be revolutionized by its size and weight. The pacified stockholders glowed as visions of pyramiding profits danced anew in their heads.

On November 18, 1898, Keely went the way of all flesh, and a delegation of four men, including a college professor and an electrical engineer, scurried to his workshop to unearth the secret of his engine. The secret was astonishingly simple. So simple, as a matter of fact, that it had absolutely no commercial value. Tracing down a mysterious piece of pipe that didn't appear to be a functional part of the engine, they uncovered a compressed-air unit mounted in the cellar beneath the workshop.

Overnight, hundreds of prospective millionaires went back to being middle-class businessmen, somewhat wiser and more than a little bitter over being bilked. But the man who had poured the most into this futile dream wasn't around to realize it. John E. W. Keely died broke, despite the thousands he had collected. Apparently convinced by his own sales talk, he had invested every cent trying to make his lie a reality.

— *Jim Mourning*

MGA —

(Continued from page 15)

of its compression ratio. It continues to fire for several revs after the ignition has been cut. But this is the only criticism we have to make of the "A's" power plant. It's a good combination of ruggedness, economy of operation and maintenance, and healthy output.

MG's old motto "Safety Fast" is highly appropriate for the "A". The machine's good steering, roadholding and acceleration are backed up by a set of genuinely outstanding brakes. The ten inch drums are heavy iron castings that show little tendency to expand. The retarding force of the brakes registered the unusual high of .86 g on our instruments, and over the ten-stop fade test they lost only 9.3 percent of their efficiency. (Some cars that Sports Cars Illustrated has tested have had fade losses of 25 percent and more.) From these figures it would seem that the "A's" perforated disc wheels do a good job of brake cooling which can be made still better if you use the optionally available wire wheels. For racing, the factory recommends the harder Ferodo BG95/1 lining, which gives even more fade-proof braking.

The body of the MG "A" is bound to be a controversial subject as long as there are still partisans of the old Thirties-styled models. The TC unquestionably deserves the much abused title of "classic" and the TD and TF proved to a lot of people that it was impossible to get a better looking car by "refining" the crisp, spidery TC.

As it is now, the "A" is a very attractive car from any angle, and downright beautiful from some. Its look and feel of quality closely approach those of some cars that cost twice as much money. The body feels and is very substantial. The quality of the painted finish is good, there's no skimping on the instrument panel, and the reinforced bumpers are very ade-

On the negative side, raising or lowering the top is a hassle, luggage space is minute, and the inside door panels are sub-standard compared to the quality of the rest of the machine. The 12-volt electrical system is fed by a pair of six-volt batteries in series, mounted behind the seats but accessible only if you haul the spare tire out of the luggage compartment!

In order to get the "A" 2½ inches lower than the TF, the frame rails have been bowed out enough to permit the occupants to ride between and alongside them. Sports Cars Illustrated's staff found the semi-reclining seating position perfectly comfortable, but criticized the seat-backs because they support only the shoulders. The driver sits with left leg extended to operate the clutch and right leg cocked to operate the throttle. This turns out to be a comfortable driving position, particularly since the high transmission tunnel provides good sup-

On the "A" the headlight dip-switch, which in previous MG's was on the instrument panel, is mounted on the firewall, which is stepped and lies in two planes, the higher portion roughly one foot farther aft than the lower. This means that to operate the switch you have to pull your leg back from its normal, relaxed, clutch-operating position and raise it high enough to prod the switch. Foot pedal room is better in the "A" than in earlier MG's but it's still easy to hook throttle foot on brake pedal, or hit the throttle pedal when you want to brake. This happened to most of our testing crew and made an unforgettable impression; it happened only once per driver.

The air flow around the car at speed with the top down is such that there is very little turbulence in the cockpit—the occupants get little wind buffeting, and conversation in normal tones can be carried on with ease except at high rpm's. With the top up engine noise is magnified, of course. And like most fabric tops the "A" rattles and booms against the wind. The side-screens are well designed, their lower third being a separate panel that can be pivoted outward against a spring-loaded plunger.

But ventilation is either all-off or all-on; there are no openings in the screens to permit the entry of outside air. There are also no external door handles, and reaching in through the spring-loaded flap and down to grasp the door-latch pull-cord can be fairly awkward.

With all its little irritations, this is a basically safe, friendly, likeable car —a genuine, well-built sports machine at a price that can't be considered anything but reasonable and fair. We'd be much surprised if the "A" sales situation were anything but what it is: demand fantastically ahead of supply. It's a very desireable car that will give years of economical driving pleasure and then have the high resale value that MG's have earned

— Griff Borgeson

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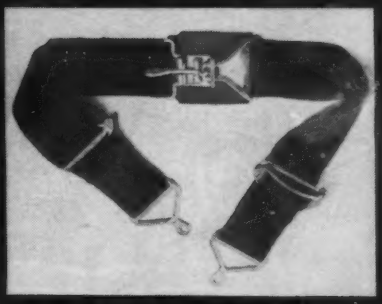

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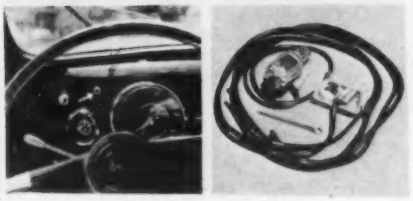

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They Had To Be Tough

GIVEN two martinis and half a chance, many an aspiring Nuvolari will regale the uninitiated with a finely detailed account of the rigors and hardships of road racing. Admittedly, racing is considerably more vigorous than quoits and a driver can work up a fine film of perspiration and a strained muscle or two during a main event. But the plain truth is that he never had it so good.

Back in what has been loosely described as the good old days, riding mechanics weren't taken along just because they were good company — their's was a definite job — to see to it that the car finished without resorting to a basket. That so many of them survived the effort is a tribute to their ruggedness, and, perhaps, a modicum of luck.

Back in 1909, for instance, Gil Anderson, who later took the easy way out by becoming a prominent driver, attracted notice for the first time as a riding mechanic in a race at Crown Point. Riding a Marmon driven by Dave Munson, he dutifully dismounted and went to work when the rutted road, more suited to placid cows than powerful cars, shook the carburetor needle valve open. A few miles and a few minutes later, it vibrated loose again and once more he dismounted, screwdriver in hand. Although this was probably beneficial to the development of a strong character, Anderson soon came to the conclusion that it was not conducive to winning races.

There was only one thing to do. With fifty miles remaining, Anderson leaped astride the pitching, swaying hood and constantly readjusted the carburetor needle as the Marmon rocketed along the road and across the finish line.

That same year, a riding mechanic named Bailey saved the day for Louis Disbrow at Long Island. The pair had barely thundered away on the first 20-mile lap when the pin fell out of the reach rod, reducing the steering gear to a purely ornamental attachment. Without a moment's hesitation, Bailey cat-footed along the hood and clambered onto the exposed front axle. Bracing his feet, he anchored himself to the radiator with one hand and held the steering rods together by sheer brute strength until the car could limp into the pits for repair.

But not all the services required of this rugged breed of men were mechanical. Once, Smiling George Robertson, the first American to win the Vanderbilt Cup, had the seat of his mount collapse from beneath him — thereby restricting his field of vision to one uncomfortably close section of steering wheel. Riding mechanic Glen Ethridge was equal to the occasion. Grabbing Robertson under the arms, he tugged mightily, hauled him back into a driving position and held him there until they had won the race.

Although things weren't always so hectic for the riding mechanics, even the most ordinary tasks sometimes proved dangerous for them. In the 1913 French Grand Prix at Amiens, the leading Delage, driven by Guyot, blew a tire while slamming through a fast "S". Eager that the lead should not be lost, the mechanic leaped from the car while it was still rolling, lost his footing and was run over by a rear wheel.

And in the 1904 Vanderbilt Cup Race, a Mercedes driver pulled up to check a mechanical difficulty at the base of the block, got carried away by the sounds of the rumbling behemoths as they lumbered past, forgot where his partner was and charged away, running over the mechanic.

So the next time a driver dramatically waves an olive-festooned toothpick in the air and begins his plaint, it might be kind just to suggest tactfully that he consult one of the riding mechanics of a bygone era and discover just how rugged racing can be and was.

Letters

(Continued from page 7)

future road tests

Dear Editor:

Your September issue of Sports Cars Illustrated contained an excellent article on the Mercedes-Benz 190 SL. Your straightforward and truthful approach to the subject made me feel sure that if you have or will publish anything on the Porsche Carrera and the Lancia Spyder, your reports would be reliable. Since I'm planning to buy one of these three cars, all information is appreciated.

Sincerely yours,
Capt. Walter Williams
Seattle, Washington

Thanks — our policy is to be as unbiased as possible. Stories on both cars are coming up in the near future.—Ed.

sports car "practicality"

Dear Sir:

I am interested in sports cars but would not like to sacrifice all "practicality". What I am looking for specifically is a car of smaller than Detroit dimensions with a four passenger capacity and reasonable trunk space, with the emphasis placed on mechanical quality rather than quantity of chrome trim. Has anyone seen such a car or is it too much to hope for?

Sincerely,
2/Lt. J. Kleckner, USAF
San Francisco, Calif.

Sorry, Loot — you can't have everything in one bite. In a sports car you either have sitting room or luggage room but not a lot of both; a modicum of each perhaps, but never a lot. You can, of course, wait for the four-seat Thunderbird but don't hold your breath while waiting — it'll be a year according to late reports. So far the TR 3 and the '57 Austin Healey 100-6 are the best bets. And then there's always the Porsche. — Ed.

canada's glen?

Dear Editor:

On September 28th and 29th the British Empire Motor Club of Toronto ran its annual Indian Summer Trophy Races at Harewood near Jarvis, Ontario. Harewood is an abandoned air field with a fast and excellent surface exactly three miles from start to finish.

There were several entries from as far away as Florida and California. There were several Jag's, MG's, TR's, Mercedes and Ferrari's, etc.

In my opinion, Harewood is Canada's answer to Watkins Glen.

Yours truly,
John Brennan
Toronto, Ontario

Hm-m-m; could be. — Ed.

Texas Triumph —

(Continued from page 11)

wheeled shell is car-like; with the engine immediately behind the driver and his legs stretched out on each side of the front wheel – the handlebars almost in his lap.

Tension mounts as he stretches out one arm at a time so that his sleeves can be taped at his wrists. Even inside the shell the wind catches at everything that's loose. His helmet is the last thing to go on before the side pieces that serve as a partial cowl go up and are locked. All that's visible of the driver now is his helmet that bobs occasionally as he checks the controls.

It looks awfully lonely in there as they push him off and when the engine fires and Mangham pulls loose the odd looking launching rig, you can't help but remember Allen's remark that each run, even at 200 mph and over, seems to take an awfully long time. You watch as the machine dwindles and disappears from sight, your ears straining to keep track of the exhaust note that tells you he's still on his way, and you notice that everyone is especially polite to Mrs. Allen who has moved over near the phone. The relief you feel when the "He's there" comes over the phone is short-lived because it's almost immediately followed by the "They've turned him around; he's on his way back."

You can't hear an exhaust for ten miles, even over the salt, but you try, and the tension never lets up until Allen passes the starting line and releases the small parachute used as an airbrake. Then you can laugh at the sight of Mangham and Wilson chasing this wobbling, now ungraceful thing, in an effort to catch it before it falls over.

It is a new record, established, not by a tremendous organization with almost unlimited resources, but by two men who refused to let the odds beat them, and one man who had the skill and the fantastic courage it must have taken to keep the throttle cranked on.

COMING NEXT MONTH:

The Horse Strikes Back!

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by Merwin Dembling

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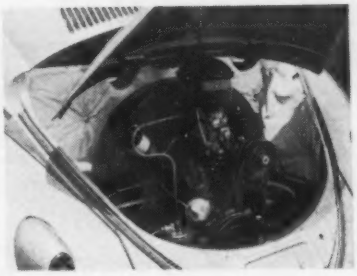

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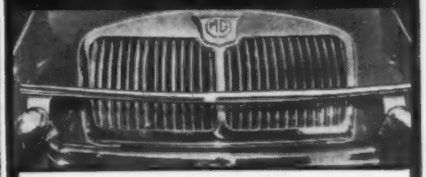

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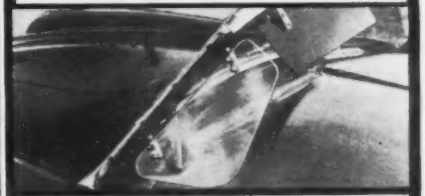

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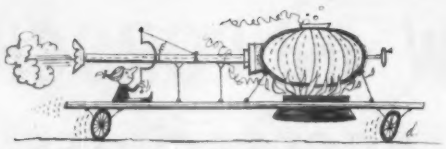


Carriages Without Horses

WHEN a turbine-powered Renault hit 191.2 mph at Bonneville, many enthusiastic individuals heralded it as proof of the arrival of the ultimate in transporting the human frame from one point to another. The more cautious, however, wrote it off as just another step in the search for a satisfactory method of propulsion.

The same claim, they pointed out, was made for the electric, steam and gasoline engines, all of which proved adequate even if limited. And some of the earlier solutions were neither as successful nor as practical.

In 1600, for instance, the Dutch came up with a two-masted vehicle capable of seating 28 passengers and reaching 20 mph. And memoirs of pioneers crossing the American continent as late as the mid-1800's frequently comment on seeing wheeled sailboats on the prairies of the midwest. Although the economy of this system cannot be disputed, perhaps it is just as well that it never achieved wide acceptance. The thought of seeing a field of Ferraris and Maseratis swirling around LeMans under full sail is somehow unnerving.

Then Sir Issac Newton felt impelled to focus his inventive genius on the problem. In 1680, he designed a vehicle that skirted the edge of the theories later used in steam and jet propulsion. In essence, his power plant was a huge, water filled globe with a tube pointing rearward. When a fire beneath had brought the water to a suitable temperature, movement was to be achieved by opening a valve and letting out a blast of steam. Fortunately none of these machines was ever produced — as a snappy, two-seater sports version would have been about the size of a city bus.

Next were the windmills (which provided the power for cars) designed by a Frenchman named DuQuet in 1714 and J. H. Genevois, a Swiss clergyman, in 1760. At one time, the British government displayed great interest in the latter machine.

In 1820, one W. Cecil read a paper before the Cambridge Philosophical Society describing his brainchild. By using a combination of hydrogen and air, he intended to create a vacuum in a cylinder. Then, he assured his spellbound listeners, outside air would push against the piston, forcing it down and turning the wheels in a sort of reverse internal combustion process.

Six years later, Samuel Brown used the same principle — substituting commercial alcohol for hydrogen — in a vehicle that actually trundled about under its own power.

But the sweep and scope of design imagination didn't reach a peak until 1867. In that year, two eager inventors named Otto and Langden startled Parisians by displaying a free-piston engine. In theory, an explosion at the base of a huge, upright cylinder forced a heavy piston upward in unimpeded flight. But coming down, the piston engaged a rack that turned a set of gears connected to the wheels. The piston was then supposed to force the burnt gases out, compress the fresh air and start all over again.

By 1894, a vast majority of those in the field were concentrating on steam, electricity or gasoline. But included among the entries in the Paris-Rouen race of that year were vehicles with power supplied by systems of levers and pendulums, gravity, hydraulics, and weight of passengers and compressed air — the latter being an idea cooked up by an American named Hartley.

Nor did strange attempts to supply a solution die out with the advent of the present century. Obviously, if there was something to be said for both electric and gasoline buggies, twice as much could be said for a combination of the two. Consequently, motoring enthusiasts of 1918 were offered the Woods Dual Power, which contained, in addition to batteries and an electric motor, a four-cylinder gasoline engine that turned a generator which supplied current to the batteries that powered the car.

And while the engineers of the outside world worked diligently on various approaches to the problem, Russia announced, in January of 1955, that they had perfected an atomic-powered car. Coming from a nation that modestly admits to having invented everything but Adolf Hitler, this failed to create the excitement it might have.

— *Jim Mourning*

Record Runs —

(Continued from page 37)

of both the front and rear mains. The H section connecting rods are tempered steel forgings of the same quality steel as used in the crankshaft. They're of slightly thicker section than the production connecting rods. This extra thickness is probably gained by slightly blocking open the dies during forging.

Following the practice of keeping the engine as short as possible, the connecting rod journals are offset in relation to the cylinder bores. Both the end connecting rods, number one and four cylinders, are offset outwards and the two inner rods are offset towards the center of the engine. The big ends of the connecting rods are split diagonally to allow each piston and connecting rod to be removed by pushing it upwards out of its bore. Forged aluminum three ring pistons establish a compression ratio of 9.2/1.

The light alloy two-cam head carries each camshaft in three plain bearings. The intake and exhaust valves are disposed at an included angle of 80 degrees. Ferrous valve seat inserts are used. The valves are actuated directly from the camshaft through cups that are fitted over the coil springs and valve clearances are effected by means of an adjustable pad contained in the end of the cup.

The cam tower is separate from the head and bolts up to the block in the same manner as the stock timing cover. Primary cam drive is by means of gears from the crankshaft. This cuts down the secondary drive, which is by chain to the camshafts, to half-engine speed. Reducing both the length and the linear speed of the chain is an important consideration in a high revving engine.

The Lucas magneto is driven by means of a skew gear from the front of the crankshaft. Two dual throat Webers supply the carburetion and are fitted with ram tubes that pick up the air from a balance box. One hundred bhp is claimed for this engine used for the straightaway runs red-lined at 6000 rpm. The sprint engine used for the straightaway runs is identical to the distance engine, with the exception of a higher compression ratio necessary to run on an alcohol mixture.

Whereas MG used one car with different engines for their distance and straightaway records, Austin - Healey brought two complete cars. Since both

these cars have basically the same engines of rumored prototype design, it would be well to discuss them here before taking a look at the cars. Of six-cylinder, pushrod-operated overhead valve layout, the block and cylinder head are cast iron.

The bore and stroke of 79.4 mm x 89 mm (3.125 inches x 3.5 inches) give a capacity of 2639 cc's (161.61 cubic inches) and a piston area of 46.2 sq. inches. The head is of Weslake design and has the now famous heart-shape combustion chamber. The intake ports are siamesed as are the exhaust ports for the inner four cylinders (two-three and four-five). The engine of the distance car uses a compression ratio of 9.3/1 and runs on premium fuel.

Carburetion is by three dual throat Webers. The exhaust system utilizes split headers that collect the exhaust gases from cylinders one, two, three and from cylinders four, five, six. This engine develops 150 bhp at 5000 rpm on gasoline.

In the streamlined straightaway engine the Godfrey K-300 supercharger is chain driven from the front of the crankshaft. A single SU carburetor is used. Three hundred bhp at 5000 rpm is claimed for this engine on a specially blended alcohol fuel.

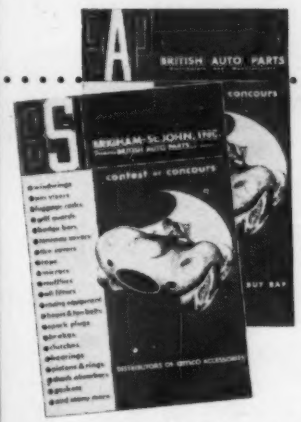
The Austin-Healey distance car, which on Friday after its earlier difficulty, set new six-hour records at over 145 mph, is quite interesting in that it is fully road-equipped. It has a standard electrical system including headlights and tail-lights. Dunlop disc brakes operate on all four wheels. The passenger's compartment, although covered with an aluminum tonneau cover for the record runs, is actually suitable for carrying a passenger.

The car claims a basically Austin-Healey 100 chassis and body, although the body has been extensively modified at the nose and tail to improve the streamlining. The long nose is reminiscent of the Mondial Ferrari and the lengthened, streamlined tail carries a large faired headrest. Dunlop knock-off disc wheels and 6.50 x 16 Dunlop racing tires are used. The gearbox is a standard four-speed Austin-Healey unit without overdrive. A final-drive ratio of 2.7/1 representing a speed of 31.75 mph per 1000 rpm or about 160 mph at 5000 rpm was fitted.

The straightaway car uses an Austin-Healey 100 chassis with standard wheelbase, ground clearance, and track dimensions. The body follows the usual streamlining practice and the cockpit is cowled to enclose the driver. It is equipped with Dunlop disc brakes, knock-off disc wheels, and Dunlop racing tires. A David Brown four-speed gearbox, incorporating overdrive, used in conjunction with a final drive ratio of 2.466/1 gives a speed of 43.50 mph per thousand rpm in top.

On August 21st this car was driven by Donald Healey to a two-way average of 200.9 mph for the flying mile. This was not a record attempt, a certified run of substantially over 200 mph being desired by Donald Healey.

All in all this was a record session that BMC can be proud of. The MG succeeded in establishing an impressive number of records at fantastic speed for a 1500 cc engine. The Austin-Healey distance car came through very well by establishing the records needed to put the marque in possession of every record from one mile to 3000 miles.



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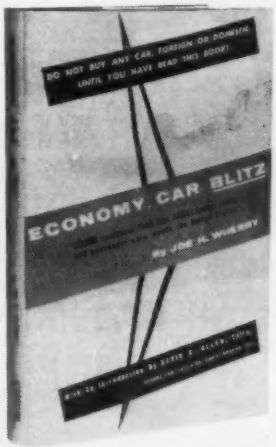

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CITY & STATE_____

Baling Wire, Scotch Tape and Hope

WITH Carroll Shelby emerging from the 1956 racing season as the most promising pilot on the American scene, erudite students of things competitive are eagerly scanning form sheets for evidence of one characteristic considered vital in a really top driver. Can he produce despite the various and sundry difficulties that inevitably crop up to plague members of the dicing fraternity?

Shelby boosters chorus loudly in the affirmative. When the question of proof is raised, they invariably point to Buenos Aires and the international sports car championship race of 1954.

In that year, the Municipal Government of Buenos Aires and the Sports Car Club of Argentina invited a team of four cars from the Sports Car Club of America to participate in a 1000 kilometer endurance event, to be held in conjunction with the Grand Prix of Buenos Aires. In addition to the possibility of cash — vague as it might be, with the field led by drivers like Farina, Trintignant and Maglioli — there was the added incentive of the Kimberly Challenge Cup. This had been donated by Jim Kimberly in 1952 and went to the first club driver to finish, regardless of overall position.

Naturally, the Americans accepted the challenge and rounded up a team consisting of Shelby in a Cad-Allard, Phil Hill/Dave Sykes with a 4.1 Ferrari, Masten Gregory/Dale Duncan in a C-Jag and Boris Said/George Moffett in an OSCA. Facing them was a four car Argentinian entry led by the Menditeguy/Bonomi three-liter Ferrari.

When the flag fell, Farina moved to the front, where he eventually finished, and the American team began to contemplate basket-weaving as a more profitable hobby. The OSCA sheared the main drive into the gearbox. The Ferrari's differential seized. And Gregory's C-Jaguar developed a sick cylinder that relegated him to the role of a motorized spectator.

The American team's mood was a study in dark blue and a check with Shelby's pit did nothing to brighten it. He had been in and out of the pits like a man in a revolving door. One of the cycle fenders had fallen off and had to be tacked back. A tread had peeled from a tire. Then the gas tank had burst and poured gasoline into the cockpit. Before mechanic Jack Joerns could wipe the dirt of a hasty patch job from his hands, the car was back — burning briskly. But they had gotten it back on the track and, everyone agreed, that was something.

Things were only beginning for Shelby and his mount, however. Within a few laps, the bonding on one of the brake drums came loose and one wheel began grabbing. Then one exhaust pipe dropped off and bounced gaily along the concrete in front of the pits.

Finally, with the American contingent reduced to gnawing nails and crushing crash hats, a man approached the pits and politely offered to return a small piece he had seen drop from the limping Cad-Allard. The pit crew turned pale. Signalling Shelby in, they popped the hood and confirmed their suspicions. The small piece was one of the engine mounts. After what seemed like an eternity, a makeshift fastening was finished and the car sent back onto the circuit.

Then someone thought of checking the Argentinians and hope flickered again, ever so faintly. They, too, had lost three of their cars. The Menditeguy/Bonomi Ferrari, however, was in second place. Against it, far back in the pack, the Americans had only a car held together with baling wire, scotch tape and hope.

But, someone ventured hopefully, something could always happen.

In true story-book fashion, something did happen. With only 60 miles left to go, Menditeguy pulled in for fuel and a driver change. As Bonomi roared out of the pits, the ring gear and pieces of the differential dropped out onto the pavement and the car coasted to a stop alongside the circuit.

With the American team sweating it out in the pits, Shelby nursed the ailing car during the last 60 miles; finishing ninth overall and claiming the Kimberly Cup for the United States.

Pit Stop

(Continued from page 9)

SCREAMER FROM KENOSHA?

I was delighted with the November issue of SCI, and particularly with the article on "The Screamer's Kissin' Cousin", since I am interested in building a "Screamer" of my own for road use.

The Devin Fibreglas Bodies advertised in the same issue are just what I have been waiting for. To keep costs at a minimum I feel that a complete or nearly complete chassis would be most desirable. The only catch is that there are very few American cars with an 80 to 88 inch wheelbase. The Nash Metropolitan has an 85 inch wheelbase, and I would like some technical dope on this. I would also like to know if any information is available on the conversion of any standard Detroit chassis to that of a sports car.

William H. Harmon Jr.
Tiffin, Ohio

The Devin body is certainly a good-looking shell, and will undoubtedly inspire a lot of people to build cars underneath them. We do feel, though, that a sports car should properly start with the chassis and go from there. In other words, look for a chassis you like and find a body to go over it.

The Nash Metropolitan, as you know, is built in England by the British Motor Corp. and uses a lot of Austin parts. It is a unit-construction automobile, and has no separate chassis frame; body and chas- are one. There is a vestigial frame in the floor platform, but it's still of little or no use as a basis for a "Screamer".

About the only Detroit chassis that's adaptable to sports car use is the old Henry J frame, and even that needs both structural and suspension stiffening. The Corvette, of course, is a sports car, and has a good but heavy chassis. You'd do better to look for a burned-out or wrecked MG or Healey, and adapt an American engine and special body to this. Any reworked American frame usually ends up too large and heavy to give acceptable handling. One final thought is the pre-1948 Ford chassis, which could be shortened and braced to your requirements.

VW VELOCE

I'm interested in Volkswagen modifications. Is there anyone making VW cylinder heads with higher compression ratio, larger valves and provision for dual carbs? If there is no one making such heads—and I have found no one—do you think there would be a market for such a set of components at a reasonable price? I can make them very cheaply from aluminum.

As I understand it, there's an Austrian company that makes such heads for their own modified VW's. Could you give me some information on them and their address? I would appreciate any suggestions that you or your readers might have. I know that the VW company doesn't like

(Continued on page 66)

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(Continued from page 64)

such modifications, but this is the U.S.A. and we believe in free enterprise.

William P. Hedl

We know of no one in this country engaged in this pursuit, which is potentially a successful and worthwhile one. Very few VW owners will admit to being fully satisfied with the performance of their otherwise satisfactory machine, and a well-engineered replacement cylinder head would be a sure-fire seller, particularly if a pair of them could retail, with all installation parts, at slightly less than the price of a supercharger for the VW. Designing them will be no cinch, though, unless you are a devoted student of the VW or an old hand at air-cooled engines.

There should be some basic criteria to promote low first cost. The original head studs should of course be usable. If the original pushrods and rocker arms can be shifted over to new shafts and supports in the new head, some expensive forming and forging will be bypassed. All cooling fins must conform to the existing fan ducting, and must have as much if not more area than the present fins. On the other hand, the valves must be angled to get a significant area increase, and American-made valves should be used if at all possible. The new domed combustion chamber would call for specially shaped pistons—another design problem. Bypass this step if you can, and save both money and time for the purchaser. Valve seats and guides should also be readily-available parts.

A big service can be done to humanity by desiamesing the intake ports and putting in two big holes, not unlike the Super Porsche. Ports should be consistent in diameter throughout, without tapering. A wide variety of adapters can be supplied to take any suitable carburetors. In short, hurry out and start making these. We're all for it. We know how the factory feels, but whether they like it or not enthusiasts all over the world are busily whittling away the mammoth safety margin inherent in these engines. Wolfsburg would be far better advised to face the facts and authorize some of the better procedures, emphasizing as does MG that any such hacking makes confetti of the guarantee and jeopardizes the health of the ironmongery.

Indeed there has been a minor revolt in Austria, and to have gone this far it must have some support from the Powers. The Denzel cars are halfway between VW and Porsche in concept, and many of their top-end parts must be adaptable to the VW crankcase. Write: Wolfgang Denzel, Gumpendorferstrasse 19, Vienna VI, Austria.

OFFY INFO

In the October, 1956 issue of SCI you illustrated a 1500 cc engine made by Meyer and Drake to fit an MG car. Please furnish the address of M&D so that I may obtain further information concerning this engine.

H. A. Rollins
San Antonio, Texas

The address you request is as follows:
Meyer and Drake Engineering
2001 West Gage Street
Los Angeles 44, California

Sexy Six —

(Continued from page 53)

himself. Rival outfits, with their Hawks, Hornets, Eagles, Vipers, Greyhounds, Merlins, Gamecocks, etc., had made pretty severe inroads on the sum total of God's creatures; but William Lyons, not to be licked, set his ad department to work on an exhaustive combing of the dictionaries for euphonious members of the animal kingdom. They offered him everything from aardvark to zygodactyle—and he took Jaguar.

Although there was nothing very original in the design of the three models that secured SS a steadily rising prosperity during the company's last pre-war chapter, from 1935 to '39, they had an all-round serviceability which, allied to the usual Lyons line of pulchritude, was to insure them a long lease on life. When the war ended and the plant switched back from defense work to car production, car-starved Britons certainly did not complain at being offered a series of Jags that were virtually indistinguishable from those of the mid-to-late Thirties.

The only way they *could* be distinguished, in fact, was by getting close enough to read the badge on the radiator or back bumper. With the third and last change in the title of the firm, from SS Cars, Ltd., to Jaguar Cars, Ltd., the twin initials that had given old Sexy her nickname finally passed into history.

—Dennis May

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(SEAL) G. E. CARNEY, Business Manager.

Sworn to and subscribed before me this 24th day of September, 1956.

Victor C. Stabile, Notary Public.
(My commission expires March 30, 1957)

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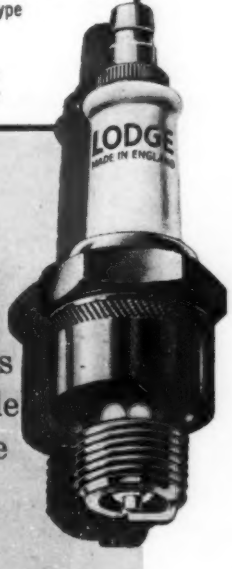

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